Products finishing

FRED W. VOGEL, Editor

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Products Finishing

AUTOMOBILES are going to lose some of their glitter in the interest of national defense under an order recently issued by Donald M. Nelson, Director of Priorities. Critical materials now used in the manufacture of decorative work in passenger cars are going, instead, into the manufacture of warships, munitions, and other things vital to defense.

The order provides that on and after December 15, 1941, the use of bright finish, bright work, metal finish, or body trim containing aluminum, copper, nickel or chrome shall be discontinued in the production of new passenger cars, except where special permission is granted for bumpers. There shall be no further production of such bright work, effective immediately, except in amounts necessary to complete passenger automobiles scheduled to be completed before December 15th.

Permission may be granted to use the restricted materials in the plating of bumpers and bumper guard assemblies, provided evidence is submitted to OPM's Division of Civilian Supply showing that all possible conservation measures have been utilized and that usage will be held to "minimum practicable quantities."

Restrictions on the use of copper in automotive equipment imposed under Conservation Order M-9-c, announced October 21st, apply specifically to garage and automotive repair equipment, headlamp and headlamp parts, heaters, horns, hub and gas tank caps, miscellaneous fittings and trim, mouldings, and rear view mirrors and hardware.

The recent limitation order does not specify what constitutes bright finish, bright work, metal finish, or body trim. Its restrictions apply not only to copper, but also to nickel, chrome, and aluminum.

What the future automobile will look like with elimination of bright work containing scarce materials will depend upon the resourcefulness of the manufacturer. By substitution of other materials, automobiles are expected to retain a pleasing appearance for the owner. An important effect of the order will be a substantial loss of business to numerous persons throughout the country who have formerly supplied the automobile industry with bright finish parts.

DECEMBER, 1941 **Vol. 6, No. 3**

Finishing Facilities Expanded Second Time Within a Year

EDW. G. DEFOE,
President and General Manager,
DeFoe Finishing Company, Chicago

AFTER modernizing its plant some months ago, the DeFoe Finishing Company, out on Chicago's Northwest side, found that the improvements which had been made brought such an increase of orders that it became necessary to further expand the plant in order to take care of this greater volume of business. It was about a year ago that executives of this company which devotes itself entirely to the finishing of industrial products for manufacturers in the Chicago area looked about for ways and means for relieving congestion in the plant, increase efficiency, and speed up the dispatch of finished products. Their study resulted in a plant modernization program, which included the installation of an overhead trolley conveyor, a water-wash spray booth, and

Fig. 1—Receiving and shipping department. Products are passed directly into the washing machine, the conveyor at the rear returning the finished pieces for shipment.

a new gas-fired baking oven.

This equipment immediately eliminated all manual handling of products once they had been placed on the conveyor, which carried them the entire journey through the spray booth, up an incline through the oven and the cooling zone, later to emerge at the unloading point.

While the company naturally had expected an increase of business and was gratified with the upward surge of orders received, it was nevertheless amazed to find before long that the conveyor system and other improvements had increased the production capacity of the plant to such an extent that the floor space available was far from sufficient to take care of the work.

To correct this condition a new one-story building of brick and reinforced steel construction was erected alongside the original plant, providing some 10,000 sq. ft. of additional floor space. This expansion necessitated some alteration in the route of the conveyor system; the installation of a continuous 51-ft. washing machine, where all work is subjected to a thorough alkali wash, two hot rinses, blow off, and complete drying before passing into the paint spray booth. In short, the added space has permitted the flow of work in a complete and continuous path, beginning at the receiving room, on through the washer, the spray booth, the drying and baking oven, cooling zone, past the inspectors for final inspection, terminating at the shipping room—all without any manual handling from the moment the pieces are placed on the conveyor to the time they are completed and ready for shipment.

It might be well to follow a piece of work as it passes through the various stages of the finishing process. Truck loads of work are brought to the receiving department of the DeFoe plant as shown in Fig. 1, coming from various manufacturers located within a radius of some two hundred miles. There is a variety of work in all sizes, shapes, and weights —cabinets for radios and phonographs, metal housings for stoves and stokers, soft drink dispensers, adding machines, check writers, and

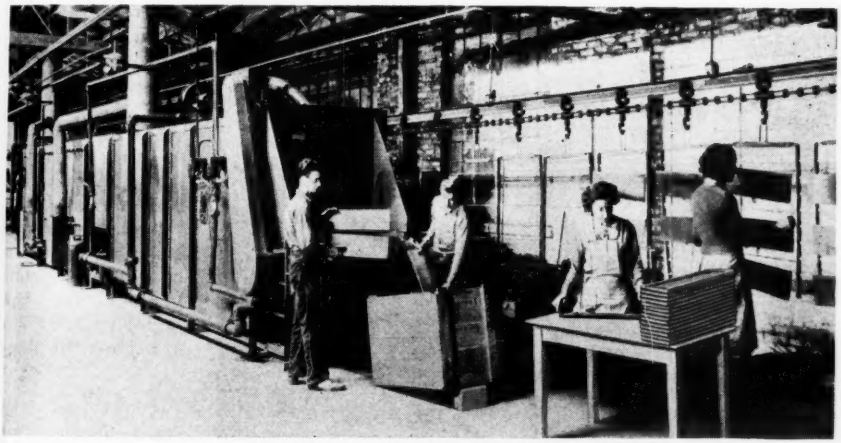

Fig. 2—Discharge end of washing machine. Here work is hung on conveyor racks moving toward the spray booth.

other business office devices and furniture, vacuum cleaners, automobile accessories, lamps, ash trays — in fact, almost anything requiring a plain or wrinkled finish in any color of paint, lacquer, or enamel.

Work to be passed through on the overhead conveyor line is assembled at the loading zone and placed on racks or hangers suspended from swiveled hooks spaced at suitable intervals along the single strand, drop-forged steel chain, designed to pass around abrupt turns and to follow the more gradual vertical curves in the I-beam track on which travel the ball bearing trolleys, and from which the conveyor chain is suspended. The racks, or hangers, are specially designed to receive the various types of pieces handled in the DeFoe plant. Pieces, such as large radio cabinets or metal housings for stoves or stokers, may each occupy one hanger, while several small pieces may travel along dangling securely from another hanger.

Once on the conveyor, the work advances in a steady procession. First coming to the automatic washing machine, illustrated in Fig. 2, where it is given a thorough washing with an alkali solution sprayed from nozzles so arranged that every part of the work is reached. This is followed by a double rinse and passage through a reciprocating heated air type dryer, assuring a perfectly dry surface by the time the work reaches the spray booth.

This booth, 20 ft. long and 8 ft. high, accommodates four operators as shown in Fig. 3. At the rear of the booth is a flood sheet or metal plate over which flows a continuous curtain of water (re-circulated), to insure good working conditions, catching the over-spray and depositing it in a trough for later disposal or salvage. Fumes are drawn into a series of ducts at the base of the rear panel and are discharged through an exhaust system leading to the roof, for the further protection of workers.

As work advances through the spray booth, the trolleys pass over a "hump" in the conveyor rail, lifting the racks and the work carried thereon to a height more convenient for the operator when spraying the low-

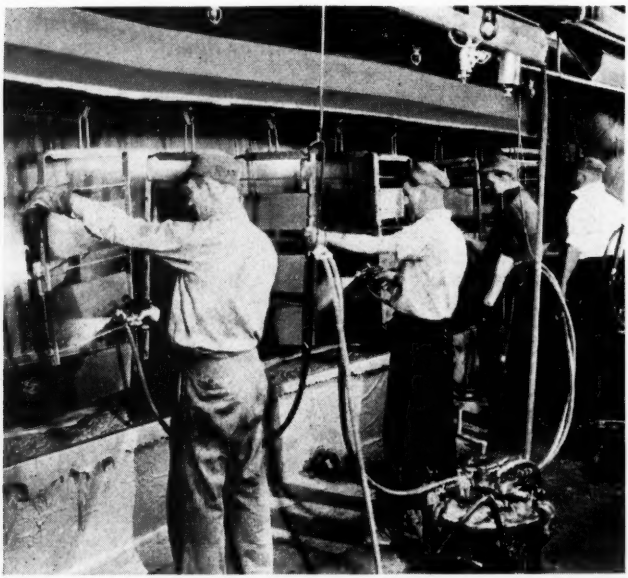

Fig. 3—Spray coating as work passes through water wash spray booth.

For WASHING BALL BEARINGS as SMALL as this:

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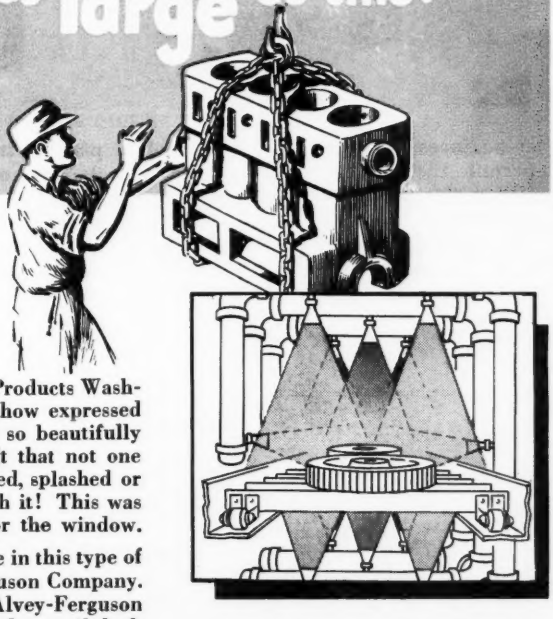

You who saw the A-F Metal Products Washing Machine at the Metal Show expressed amazement to find a machine so beautifully engineered and so finely built that not one drop of cleaning solution spilled, splashed or leaked upon the carpet beneath it! This was a *standard* machine except for the window.

Great strides have been made in this type of equipment by The Alvey-Ferguson Company. Not "just a washing machine," Alvey-Ferguson machines that wash, rinse, soap, dry or oil slush are highly specialized pieces of equipment.

WRITE today — for new folder "How 7 Famous Companies Solved Their Product Cleaning Problems" or a discussion of *your* problem with an experienced A-F engineer.

CLEANER! *because products pass through consecutive high-pressure, fan shaped curtains of cleaning solution until the products are "hospital clean."*

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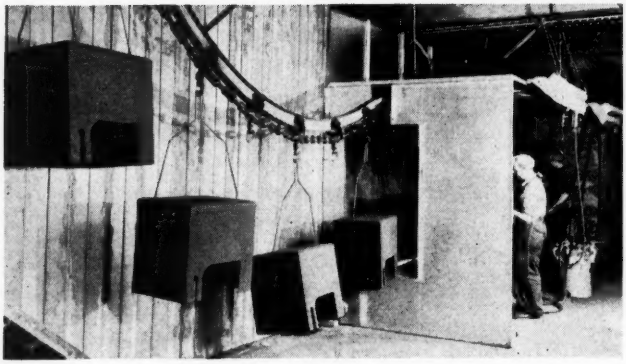

Fig. 4—Coming from the spray booth the overhead conveyor starts its upward journey to the gas-fired oven stretching along the roof of the plant.

•

er surfaces, while the swiveled hooks permit the pieces to be turned in either direction so that all sides may be reached with the enamel spray. The traveling speed of the conveyor is readily adjustable so as to co-ordinate the time required in the spray booth with baking time requirements in order to produce a perfect surface.

On leaving the shown in Fig. 4, spray booth the conveyor starts a gradual ascent, as to the oven located on the roof of the building, placed there because of restricted floor space. This gas-fired oven, of interlocking steel sheeting, ribbed panel design, is 106 ft. long, 12 ft. wide, and 9 ft. high. It consists of an outer and an inner wall of 20-gage steel panels, between which is a 5-in. layer of rock wool insulation supported by a wire netting. The frame

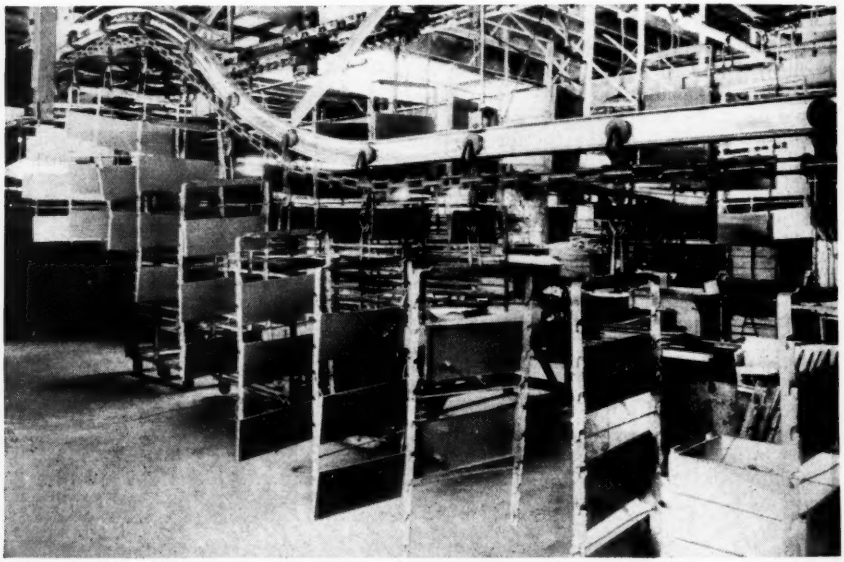

Fig. 5—Work descending from the oven and passing through the cooling zone on way to final inspection before reaching shipping room.

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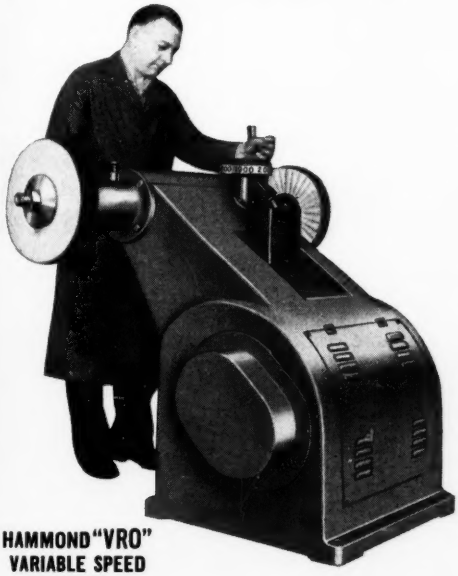

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work is of structural steel channels and I-beams, while an angle iron framing is used inside as a support for the traveling conveyor and also to reinforce the walls and roof of the oven.

offers a complete automatic control of the baking and finishing operation. Automatic controls make it possible to hold the temperature to within 5 degrees of any specific temperature at all points of the oven at any one

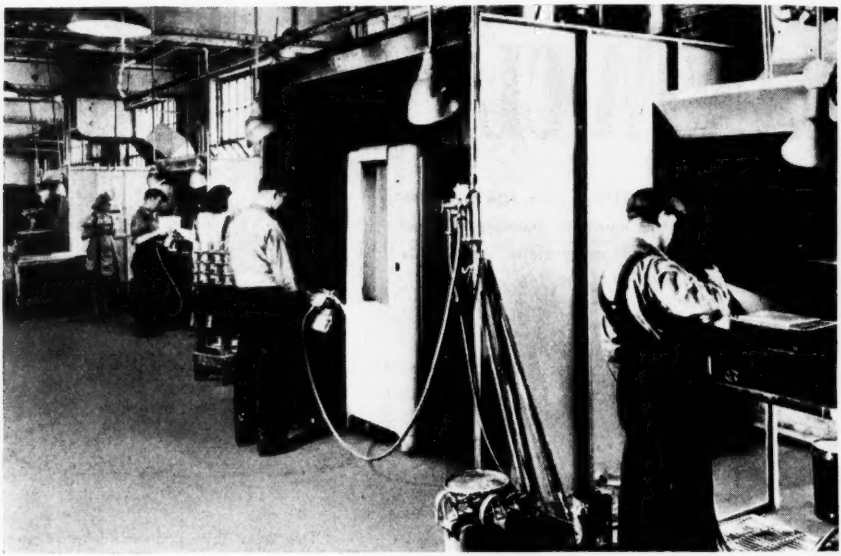

Fig. 6—A row of spray booths of various sizes for the accommodation of all types and sizes of work.

In an equipment house adjoining the oven is installed the gas heater unit, blower fans, and motors operating the oven. The heater, which has a capacity of 1,000,000 B.t.u. per hour, is equipped with four burners which can be operated singly or in combination, and is completely equipped with automatic temperature and safety flame controls from an electronic control panel on the main floor. Any failure occurring within the oven, such as a fuse blow-out, sudden stoppage of gas flow, or other possibly unobserved difficulty, is promptly indicated by a signal on the control board.

This conveyor-oven combination time. Baking time is controlled automatically by changing and regulating the speed of the conveyor to give the work passing through the oven the exact amount of time required for baking any particular finish to the correct degree of hardness. All incoming air is filtered to remove any dust or impurities before being heated and delivered to the oven. A centrifugal fan forces this heated air through the long oven, assuring an even flow of heat at every point, while a continual re-circulating of the air through the heater, also aids in maintaining a uniform temperature.

The work, suspended from the

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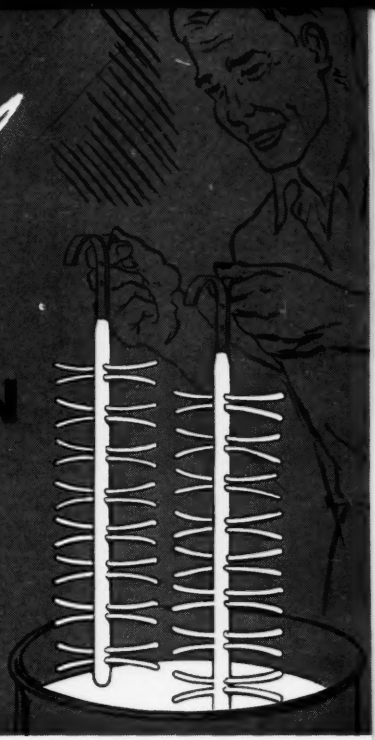

UNICHROME* "AIR DRY" RACK COATING

Insulation of plating racks has been a problem in many plants. Materials that are conveniently applied would not generally stand up well in service. Materials that withstood hot cleaners and all plating solutions had to be hot-dipped and force-dried.

But here is a tried and proved rack coating material—Unichrome* Air Dry—with all the advantages of both types. Remarkably resistant to wear and handling—unaffected by alkaline cleaners, acid dips and plating solutions—plus the convenient feature of being AIR DRYING.

All you do is simply dip your racks at room temperature and let them dry in air after each coat. Shipping container can be used for dipping.

Trade Mark—Reg. U. S. Pat. Off.

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TOUGH—withstands wear and tear of handling.

FLEXIBLE—withstands repeated flexing and bending.

DURABLE—reduces the need for re-coating.

CONVENIENT—any part can be patched without recoating the entire rack.

EASILY APPLIED—dipping can be done in the container in which it is shipped—the material dries at room temperature.

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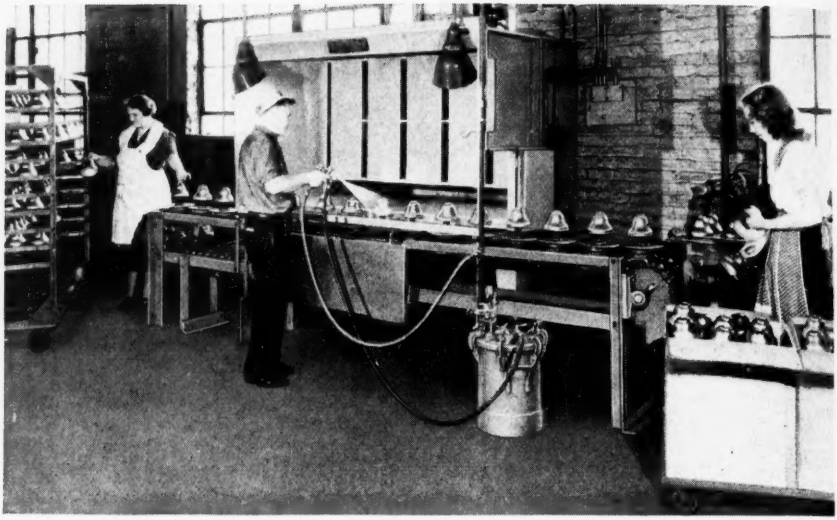

Fig. 7—Spraying shells at semi-automatic spray booth. Finished shells are placed on rack at left to be moved to box-type oven for drying with infra-red heat.

hooks, after traveling its full course back and forth through the oven, dips down into the cooling zone and swings around to the inspector's station shown in Fig. 5, where each piece of work is given a final rigid inspection before being sent to the shipping room for packing and ship-

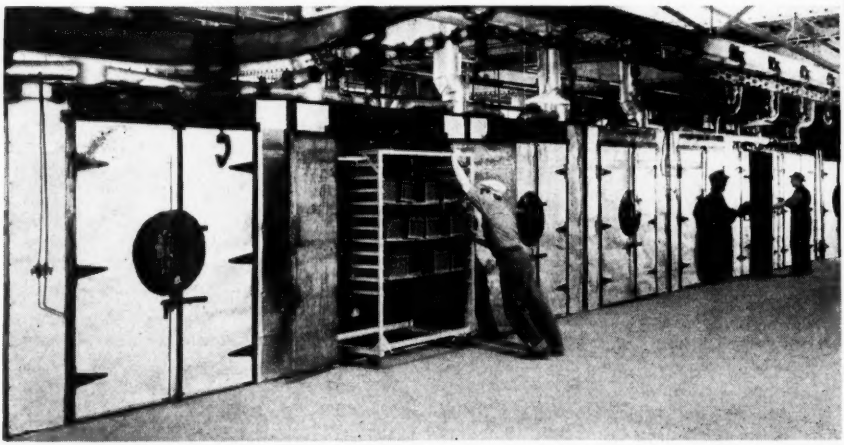

Fig. 8—More than thirty box type ovens, equipped with infra-red heating lamps are used for speeding up production.

ment back to the customer's plant.

To care for smaller pieces of work, those which do not lend themselves readily to handling on the racks of the overhead conveyor, separate equipment is maintained. There are some twenty small, individual spray booths, several of which are shown in Fig. 6, together with two conveyor dip tanks arranged in suitable groups throughout the plant. Special spraying facilities as shown in illustration Fig. 7 is also available for the finishing of a variety of small parts. Pieces finished at these booths that can be handled on racks, are passed through the large oven on the roof on the overhead conveyor, while other pieces are arranged on trucks and placed in truck ovens, equipped for Infra-red heating, as shown in Fig. 8.

In the new section is a fire-proof room used as a mixing room and for storing paint stocks. There is also a fire-proof vault to which are taken at frequent intervals during the day any waste paints and rubbish accumulated at certain points as the work proceeds, to be disposed of at the close of each working day. In addition to these precautions, the entire plant is protected by a sprinkler system. All this goes a long way towards eliminating the fire hazard and to insure the safety and health of employees and to safeguard the customers' work against damage by fire while it goes through the plant.

The company is gratified to think that it now has a plant that may be said to be as up-to-date as any in the country, where work moves along without the slightest hitch.

"Profits in Air" is the title of a four-page illustrated leaflet now being distributed by the American Air Filter Co., Inc., 237 Central Ave., Louisville, Ky., telling how electrostatic air filters help industrial plants eliminate losses resulting from contamination of products by dust, smoke, and fumes. Copy free upon request.

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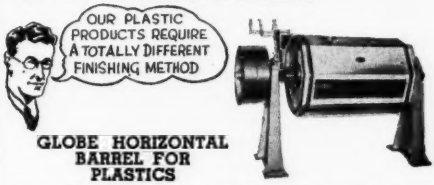

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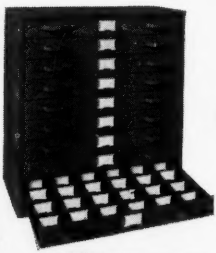

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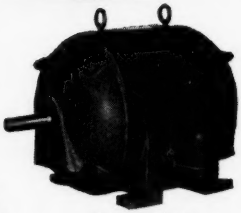

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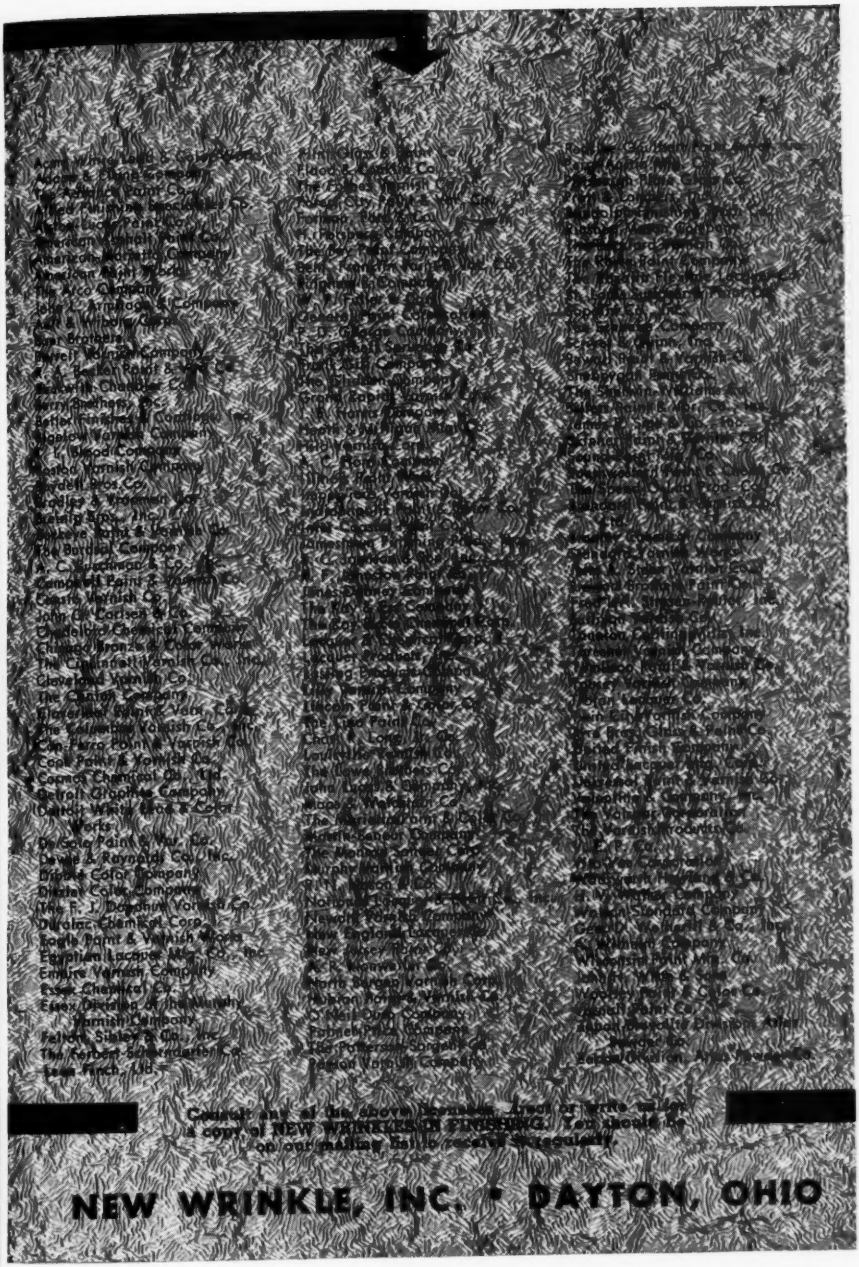
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NEW WRINKLE, INC. • DAYTON, OHIO

Modern Gold Plating

By JOSEPH B. KUSHNER, CH.E.
Metal Finishing Consultant
New York City

THE great difficulty in plating gold from non-cyanide solutions is its inherent instability in combined form. Other metals, like copper and nickel for example, can be plated from a variety of electrolytes, without undergoing any decomposition except that caused by the current. Gold, on the other hand, is a rather snobbish metal, and like Garbo, it "wants to be alone" whenever possible. Most of its chemical combinations are quite unstable and decompose fairly easily in the presence of light, heat or slight amounts of impurities, to give a precipitate of metallic gold.

The cyanide radical (CN), it seems, is one of the few anions that can tie gold up in a marital knot that's really hard to break and for this reason, its alkali metal salts are most commonly used in gold plating. There are, however, a few other anions or combinations of them, that can be used for gold plating, that do not permit the gold to precipitate out. There are, also, certain groups of anions which aided and abetted by a little cyanide, turn out to be fairly satisfactory for gold plating purposes.

We are going to give a few of these combinations here. Of course, we cannot hope to cover the ground fully, since a large number, most of them unsatisfactory, are known. Many of these baths were used years ago but they are capable with or without modification of being used today with good results.

The Acid Chloride Bath

This type of gold plating bath is an old standby and historically is practically contemporary with the cyanide bath. There are a number of variations of this bath but essentially they all contain gold chloride plus hydrochloric acid.

$HAuCl_4$	1½-2 oz.
HCl .3½H_2O	8 oz.
Water	1 gallon

The bath should be run at a temperature of 80-90 deg. F. and never above this range as there is a tendency for the gold to decompose on prolonged heating at high temperatures. The voltage used is ½-1 volt. Gold anodes are best for this bath though carbon anodes can and have been used. The concentration of hydrochloric acid may go up as high as 16 oz. per gallon without any noticeable changes in the nature of the deposit but higher concentrations than this

Part 16

are not recommended. The electrode efficiency is close to 100 per cent.

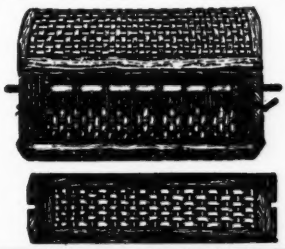
Since the rate of plating is comparatively slow—the gold is present in trivalent form and therefore deposits at 2.45 grams per ampere hour instead of the usual 7.35—metals subject to acid attack cannot be plated directly in this bath. These metals, which include brass, bronze, and so on, must be given a preliminary flash of gold from a cyanide bath before they can be plated in the acid bath. Since there is a tendency for immersion deposits to form in practically all cases, it is recommended that all metals be first given a flash of gold from a cyanide bath before going into the acid solution.

The acid chloride bath is capable of producing heavy adherent deposits of gold but the structure of the deposit is somewhat less finer grained than that from the cyanide bath and it is also a slightly softer deposit. In view of the fact that this bath calls for a pre-flash in a cyanide gold bath, it would appear to be of little value to the novelty jewelry industry where all that is required is a flash of gold. However, it may be of value in applications where a heavier deposit is sought.

There are a few variations of the previously given formula. Here is one involving the use of potassium chloride, that is somewhat superior to the first bath:

WE WISH YOU A

MERRY CHRISTMAS



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JOHN KING 48 Springfield Street **DAYTON, OHIO**

$HAuCl_4$	2 oz.
KCl	4 oz.
HCl .3½H_2O	4-6 oz.
Water	1 gallon

This bath is used under the same general conditions outlined for the previous one. The deposits from this bath appear to be a little finer grained in appearance.

Another variation:

$HAuCl_4$	2 oz.
NH_4Cl	4 oz.
HCl .3½H_2O	4.6 oz.
Water	1 gallon

Use as described previously.

Other Halide Solutions

A gold bromide solution was patented by Spencer in 1841 and Schlotter patented iodide solutions for gilding in 1932. We are not going to give the bromide solution since it involves the use of hydrobromic acid, an extremely dangerous acid to handle. The iodide solutions are of some interest however. Here are some of Schlotter's solutions:

Gold iodide	2.8 oz.
Potassium iodide	18.8 oz.
Water	1 gallon

The bath is operated at room temperature. Anodes are gold. The voltage is .1-.3 volt. The current density maximum is about 9 amps per sq. ft.

Another variation of this bath:

Iodine	20 grams
Potassium iodide	60 grams
Potassium bromide	60 grams
Water	1 liter

The solution is electrolyzed with a gold anode and cathode until sufficient gold has been dissolved into the solution to form a suitable gold plating bath.

A different variation of the bath:

Iodine	20 grams
Potassium iodide	60 grams
Sodium chloride	75 grams
Water	1 liter

This is used under the same conditions as above.

Schlotter claims that gold is present in monovalent form and therefore the deposition is quicker. He also states that there is little or no oxidation at the anode and recommends certain variations of the above mentioned formulas for immersion or dip gilding. If there is no free iodine or acid present it might be possible to use such a solution for immersion gilding. We have never tried these particular formulas but our experience with other halide baths indicates that the immersion deposits would probably tend to be too coarse and poorly adherent.

Incidentally, while we are discussing this gentleman's work we might also mention that he has patented a solution for bright gold plating, which he claims will produce fine grained, bright deposits of gold:

Gold (as cyanide)	15 grams
Potassium cyanide	140 grams
Potassium hydroxide	50 grams
Glue	2 gram
Water	1 liter

Sulfamic Acid Bath

Some work has been done on the deposition of gold from a gold sulfamate solution in the presence of sulfamic acid but it is too early to give any report on the subject. It appears to be one of the great possibilities nevertheless.

Gold Sulphide Baths

It is possible to deposit gold from a sulphide bath. In an early patent of Ruolz such a solution is given which was supposedly tested by Dumas, the famous French chemist.

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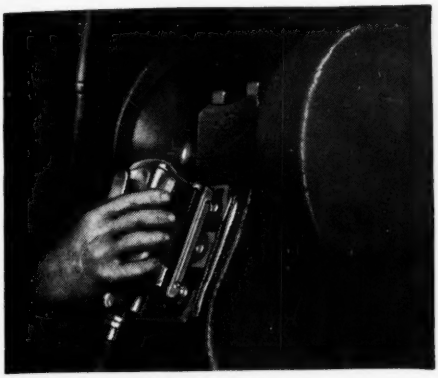

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Dumas claimed it to be a very good bath. Here is its formula.

Gold sulphide.....9 grams
Potassium sulphide solution (S.G. 1.19).....1 liter

Use at a temperature of 60 deg. C. with a current density of about 1-2 amperes per sq. ft. The deposit is bright and adherent.

The particular difficulty with this type of bath is that it gradually decomposes, precipitating gold and giving off the malodorous fumes of hydrogen sulphide. There is, of course, no reason, why a bath of this type cannot be stabilized to some extent at least, and if used under a hood, it might make an acceptable electrolyte.

Gold Thiosulphate Baths

Gold forms a complex with the thiosulphate radical but it is not as stable as that formed with cyanide. If the pH of the thiosulfate solution is not held at the proper value, sulphur precipitates and with it, the gold comes down. We have experimented with some thiosulphate solutions and have obtained some fairly good results but we are afraid we cannot recommend them for day-in day-out production purposes. Here however, are a few formulas which may be tried:

Gold oxide.....1.5 oz.
Sodium thiosulphate.....4 oz.
Potassium chloride.....1 oz.
Water .....1 gallon

Use hot as an immersion dip.

Another solution of this type:

Gold oxide.....1 oz.
Sodium thiosulphate.....4 oz.
Sodium cyanide.....½ oz.
Water .....1 gallon

The presence of cyanide has a somewhat stabilizing effect. This solution can be used for gold electroplating with steel anodes but tends to decompose after a while unless additional cyanide is added from time to time. The deposits are smooth but not too adherent.

Thiocyanate Gold Baths

Gold can be deposited from solutions of its salts in ammonium thiocyanate. The deposits are fine in structure and adherent. Here is a typical formula:

Gold oxide.....1 oz.
Potassium chloride.....1 oz.
Ammonium thiocyanate....5 oz.
Water .....1 gallon

Use this solution at a temperature of 80-100 deg. F. Voltage 1-3 volts.

The Phosphate Gold Baths

There are a whole series of gold plating baths that depend to a large extent on the use of the phosphate radical. These baths are good—their descendants are in use in today's gold plating plants—but they do require the use of a minimum amount of cyanide to really work well. Some of the formulas are:

Gold as chloride .....25 oz.
Sodium diphosphate ..... 8 oz.
Sodium sulphite .....1.5 oz.
Postassium cyanide .....30 oz.
Water .....1 gallon

The temperature is held at 60-70 deg. C and the voltage of operation may vary between 1-6 volts.

Another phosphate bath:

Gold as chloride .....25 oz.
Sodium pyrophosphate....11 oz.
Potassium cyanide .....2 oz.
Water .....1 gallon

Use hot with stainless steel or gold anodes.

Still another:

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If you want to speed up cleaning and make it possible to set a higher P-Q for your finishing department, now's the time to write for further information.

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Gold potassium cyanide .. 1 oz.
Sodium pyrophophate ....2.8 oz.
Sodium citrate .....2.8 oz.
Potassium cyanide ..... 1 oz.
Nickel pyrophosphate ....½ oz.
Water ..... 1 gal.

This solution can be used near room temperature. The ratio of anode to cathode surface should be about 2 to 1. The permissible voltage is as high as 10 volts and the current density can go as high as 30 amps. per sq. ft.

There are still other variations of these phosphate baths but this will give a general idea of the possibilities.

Ferrocyanide Gold Baths

The ferrocyanide baths to our mind, make excellent substitutes for the straight cyanide baths. We do not know the exact status of ferrocyanide at the present moment so we cannot say whether this salt is a priority proposition or not. At any rate here are some formulas that can be used for plating gold:

Gold chloride.....4 oz.
Potassium ferrocyanide...15 oz.
Sodium carbonate.....2 oz.
Water .....1 gallon

Use hot.

Another formula:

Gold chloride.....½ oz.
Potassium ferrocyanide....2 oz.
Potassium hydroxide....1.33 oz.
Water .....1 gallon

Use hot.

When these types of baths were brought into use, their great disadvantage was that they did not corrode the gold anodes. This, however, is no longer a difficulty inasmuch as stainless steel, carbon or pure nickel anodes are being used these days in most of the gold plating plants. We do recommend carbon anodes for these solutions as steel anodes are attacked somewhat, in these baths.

The ferrocyanide solutions are more stable even than the straight cyanide solutions and the color of the deposits is quite good. If a very small quantity of KCN is added to them, in the neighborhood of .1 oz., the gold deposits come out brighter.

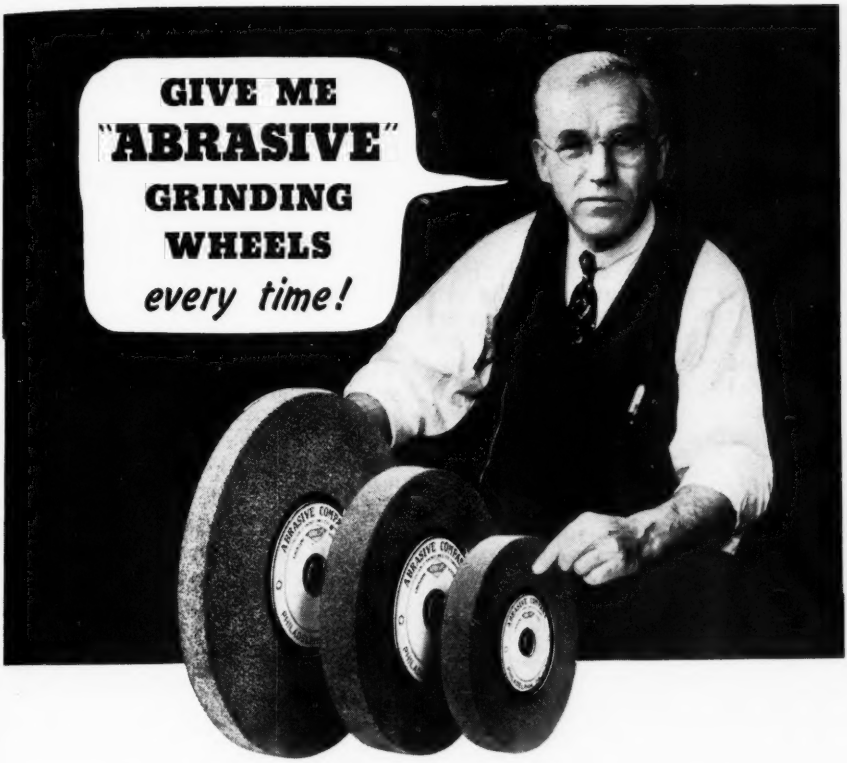
Plating Gold From Liquified Ammonia

This is mentioned purely for its interest as a scientific curiosity, but gold can be and has been deposited from liquified anhydrous ammonia systems. Water is not the only polar solvent. It is not the only liquid solvent in which dissolved salts will ionize. Liquid NH_3, pure HCN and several other liquid substances possess the same property. Literally speaking if we use an ammonia solvent system we go into another chemical world.

In the water system, we speak of a double decomposition involving water as a hydrolysis in the ammonia system the same reaction involving ammonia is called an ammonolysis. The ammonia solvent system was studied by Franklin who conducted extensive researches and in the recent past two chemical investigators by the name of Merlub and Sobel, working with small quantities, found that it was possible to plate gold from such a system. The formula they used was the following:

Gold iodide.....49 grams
Liquid anhydrous
ammonia .....25 mls.

They found the cathode efficiency of this bath to be close to 88 per cent. They also claim that they got deposits at least the equal of those obtained from cyanide baths. Unfortunately great difficulties and dangers are involved, including the use of super refrigeration and the possi-



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bility of explosion, otherwise it might be something to play around with. As for ourselves, we'll stick to water.

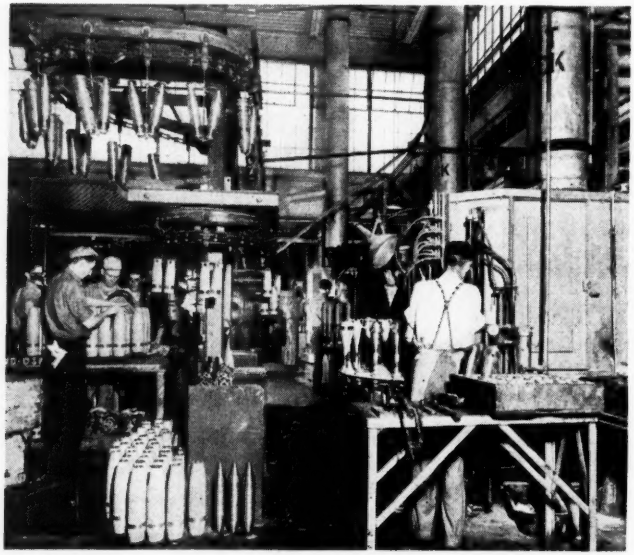
A Correction

In last months article equation 10 should read:

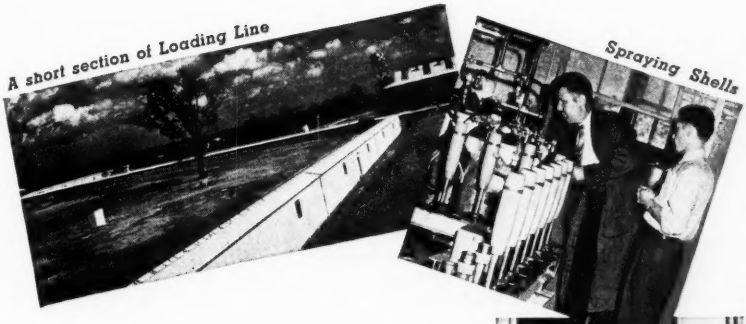
$$KCN + HCl\ .3\tfrac{1}{2}\ H_2O = HCN + KCL + 3\tfrac{1}{2}\ H_2O$$

instead of KCN + HCl = HCN + KCL. The reason we mention this is one of our more astute chemical friends took us to task about our statement that it is preferable to use a hydrochloric acid dip instead of a sulphuric acid dip before going into a cyanide bath because less cyanide is consumed by the drag in. "Your equation does not show it," he said. This is true. Stoichiometrically, the equation given in the article (Part 15) is that for the reaction of hydrochloric acid gas (pure HCL). What we meant to indicate was commercial concentrated hydrochloric acid which runs a composition close to HCL .3½ H_2O, or about 35 to 36% HCL. Roughly, 1 lb. of sulphuric acid (concentrated) will consume about 1.3 lbs. of potassium cyanide, whereas one lb. of concentrated (com.) hydrochloric acid will consume about .65 lbs. of potassium cyanide. This indicates that sulphuric acid will consume just about twice as much cyanide as hydrochloric will, which is what we said in Part 15 of this series. Of course, equivalent weights have not been considered in obtaining this result because platers do not consider equivalent weights either. The result is a practical one.

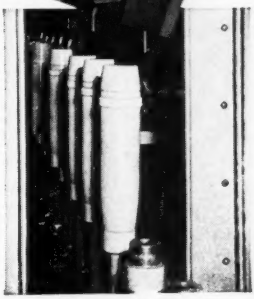
"What Every Employer Should Know About Labor Relations." How management can meet today's crucial challenge is dramatically described in an illuminating 12-page brochure now being issued by the Labor Relations Institute, 1775 Broadway, New York, N. Y. The brochure, which is entitled "What Every Employer Should Know About Labor Relations," is offered free to interested executives upon request.



Automatic spray painting equipment continues to play a vital role in the general speed-up of defense manufacture. Shown here is an interesting installation at the Budd Wheel Company plant, Detroit, Mich. A row of DeVilbiss rotary-type automatic spray machines for shells appears at the right, while the shell inspection bench is shown at the left.



ZAPON FINISHES SPEED BOMB AND SHELL PRODUCTION



Infra-Red Forced Drying

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INDUSTRIAL FINISHES

Finishing Operations On Porcel-Clad Hot Water Tanks

THE modern American household with its many labor-saving gadgets, its practical equipment designed for sheer convenience, and its necessary utensils is acknowledged by many as the "testing grounds" of metal-finishing materials. It is here that one encounters practically all of the conditions which are required to "prove" the value of a particular finish, a process, or an application. Out of the experience gained in observing the true adaptability of a finishing material on a particular product which is in use in the average household, a manufacturer can thus determine the best finish for his product.

It is little wonder then that a manufacturer of hot water storage tanks in quest of a finish for his product that would combine both beauty and permanence should decide upon one which has served to enhance the beauty of utensils and appliances in practically every kitchen and laundry. The finishing material is porcelain enamel. The uniqueness of this particular application of porcelain enamel lies in the obstacles which had to be overcome in the fabrication of the tank before and after the application of porcelain enamel. Some of the problems encountered

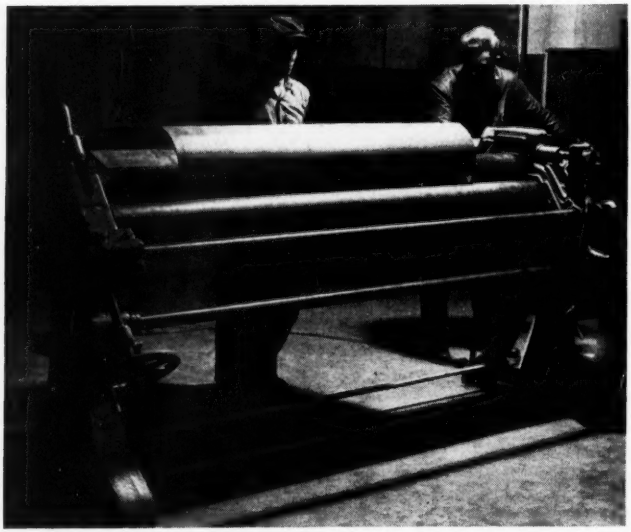

Fig. 1—A view of the roll press in which the enameling iron is formed into a cylinder.

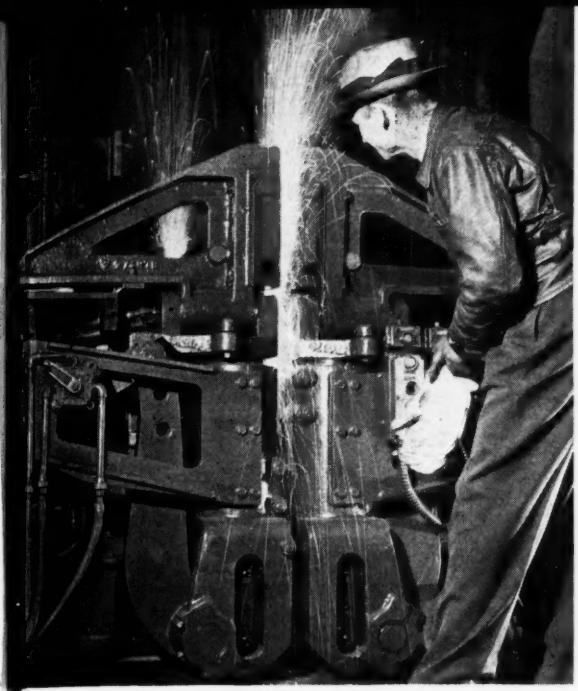

Fig. 2—The edges of the rolled sheets are welded together in this hydraulically operated flash welding machine.

in the coating of large cylinders, the methods employed in the handling and firing of the large cylinders, and the operation of joining the finished cylinder with the finished heads are but a few of the problems which are covered by the information contained in this article. The hot water tanks described herewith are manufactured by Porcelain Steels, Inc., Cleveland, Ohio. Armco Enameling Iron, manufactured by The American Rolling Mill Co., Middletown, Ohio, is used exclusively throughout the construction.

The first step in the manufacture of a porcelain enameled hot water tank is a simple rolling operation. A sheet of enameling iron cut to the exact dimensions is placed in the forming rolls of a roll press as shown in Fig. 1. The action of two rolls located beneath and one staggered roll above in the roll press unit forms the sheared sheets into a cylindrical contour ready for welding.

Following the initial forming operation, the edges of the rolled sheets are welded together in the 18-ton, hydraulically operated flash welding unit shown in Fig. 2. In approximately 9 seconds, this unusually rugged welding ma-

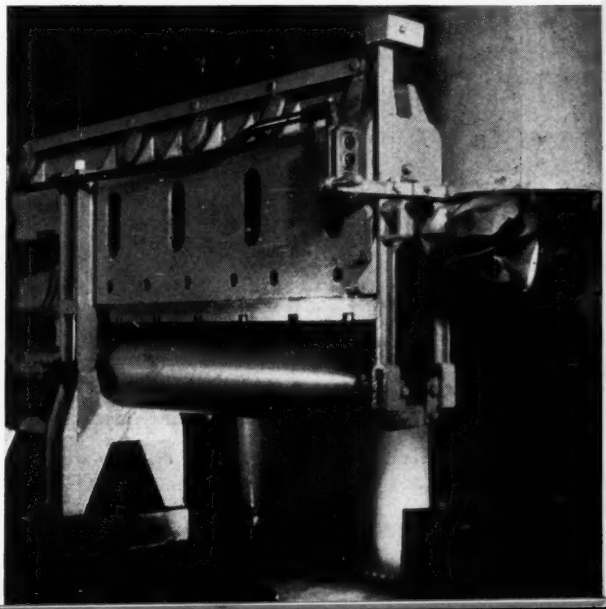

Fig. 3—Excess weld metal is cut from the seam in this machine.

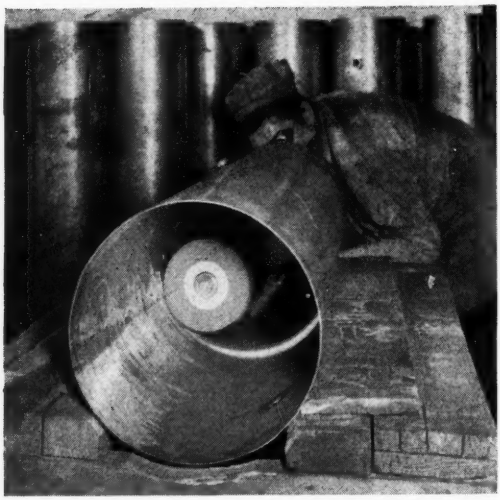

Fig. 4—Grinding the weld along the seam assures a smooth surface.

chine completes a welded join 60 in. in length. According to one estimate, the power required for the weld of this length is sufficient to light 12,000, 50-watt electric light bulbs.

Unavoidably during the welding operation, a certain amount of metal builds up at the seam which is later removed in the machine shown in Fig. 3. For this reason, the cylinder is required to "go under the knife" in the scarfing unit shown which is equipped with blades which carve away excess metal from both the inside and outside of the longitudinal weld in one operation.

After the longitudinal weld has been scarfed both inside and outside, it is ground smooth as shown in the

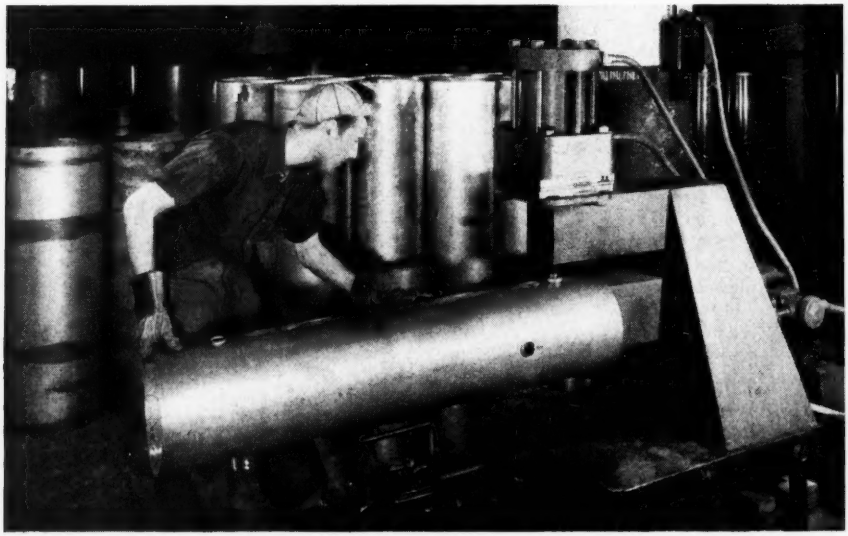

Fig. 5—Several holes are pierced in the side walls of the cylinder in the machine shown herewith.

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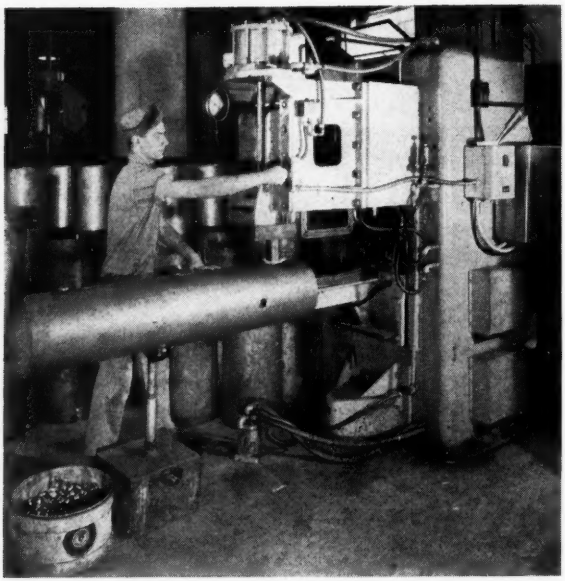

Fig. 6—Spuds are welded to the tank shell by means of the flash resistance projector welder shown herewith.

illustration designated as Fig. 4. Only grinding can remove the excess metal or weld spatter which is unaffected by a pickling bath. Should inspection reveal rough or uneven spots, the cylinder is subjected to a second grinding operation. Following grinding, the cylinder is checked for uniform diameter by means of an expansion operation.

One obstacle in the fabrication of a good tank cylinder is the presence of a flat area located adjacent to the longitudinal weld. This flattened surface is caused by the use of the three-roll bending machine which during the forming operation fails to curve the first few inches of the sheet as it enters and leaves the rolls. The out-of-round condition makes it difficult to weld the heads to the cylinders and it also produces an area more likely to flex under pressure after the tank is in use. The manufacturer, therefore, makes absolutely certain that the tank is

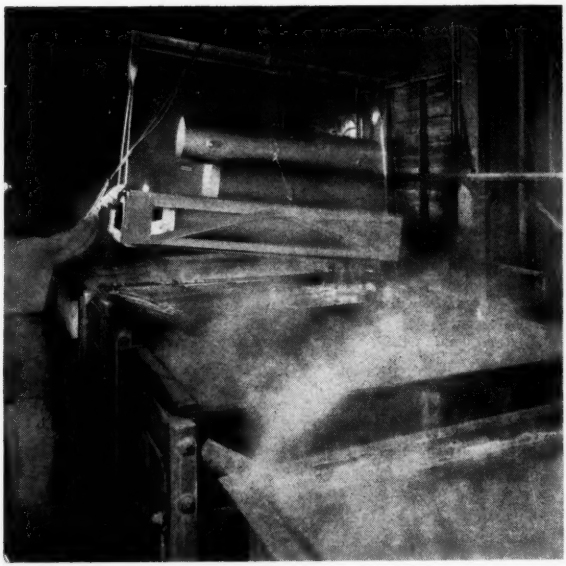

Fig. 7—A view of the cleaning and pickling department.

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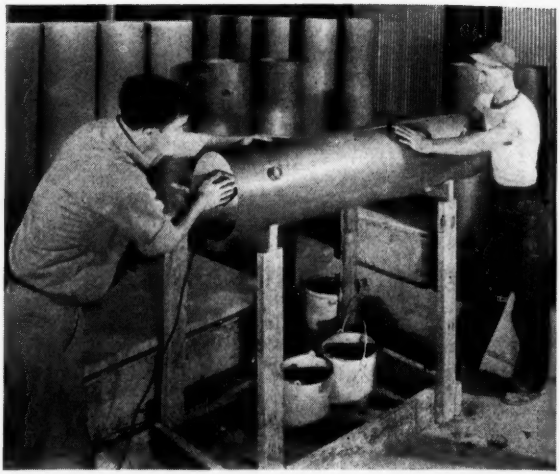

Fig. 8—The workmen shown here are checking over and hand-finishing one of the cylinders.

perfectly cylindrical in shape by means of the application of the expanding operation before proceeding to the next fabricating step.

The operation shown in the illustration Fig. 5 adjusts the welded cylinder for a punching operation in which the punching machine shown pierces holes in the cylinder shell. This is the first operation in the forming of flanges on which spuds are to be welded. The spuds to which reference is made here are short, thick, boss-like projections located in the side wall of the tank for the purpose of later inserting a fitting, valve, or other pipe connection. After the holes have been reamed to the proper size, a small flange is created by extruding the shell metal.

The spuds are welded to the tank shell by means of a flash resistance projector welder shown in Fig. 6. The inside of the cylinder is smooth because the flanges are turned outward and the longitudinal weld has been scarfed and

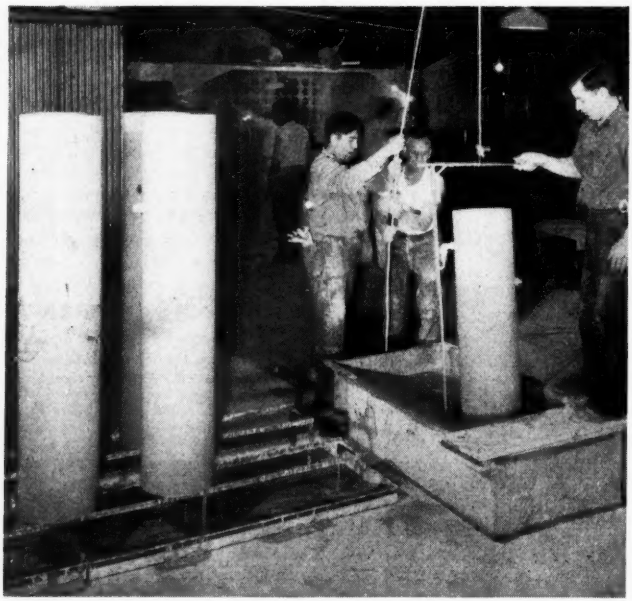

Fig. 9—A cylinder is dipped into the liquid ground coating by the workmen shown in this illustration

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When you use a protective coating material, be sure that it is particularly suited to YOUR requirements. Full information on the "Miccro" coatings which will prove most effective for your type of work—and will be most adaptable to your production routine—is yours for the asking. Call the "Miccro" distributor in your locality or write for completely descriptive literature.

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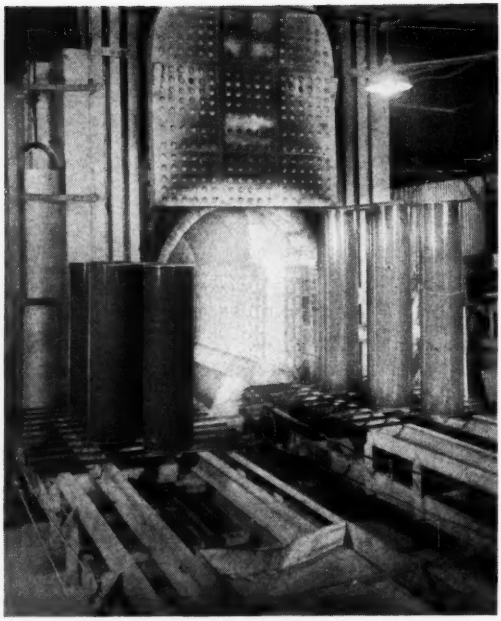

Fig. 10—The porcelain enamel ground coating is fused to the Armco Enameling Iron in the box type furnace shown herewith.

ground. Rough spots that might cause defects in the enameling operation are removed with files and abrasive cloth. The tank cylinder is now ready for the enamel finishing operation.

In the enameling department, a view of which is shown in Fig. 7, the cylinders are placed in a rack which is suspended from an electrically operated overhead hoist. A loaded rack of work is immersed into a hot alkali solution to remove grease and dirt and then into an acid bath which removes rust and scale. Thorough

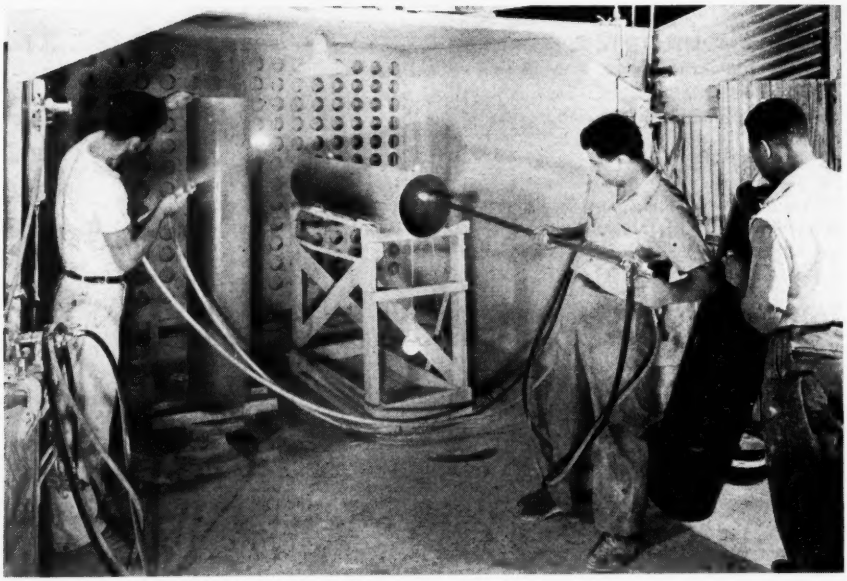

Fig. 11—The finishing coating of enamel is sprayed on in the booth shown herewith.

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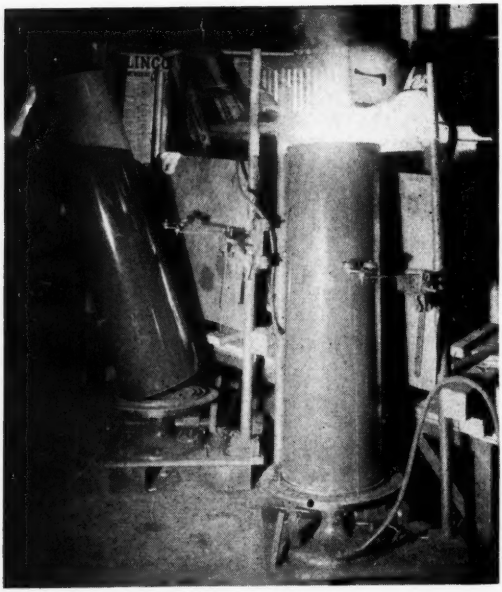

Fig. 12—A view of the fabrication operation in which the heads are welded to the cylinder.

pickling provides a uniformly clean surface so essential to the development of a good bond between the ground coat enamel and base metal.

Many times during the course of fabrication and finishing, the tank cylinders are examined for imperfections of the surface. In the illustration Fig. 8, several workmen may be seen checking over, and hand finishing a cylinder. A fine grade of abrasive is used to remove slight surface roughness which has been revealed by the pickling operation and

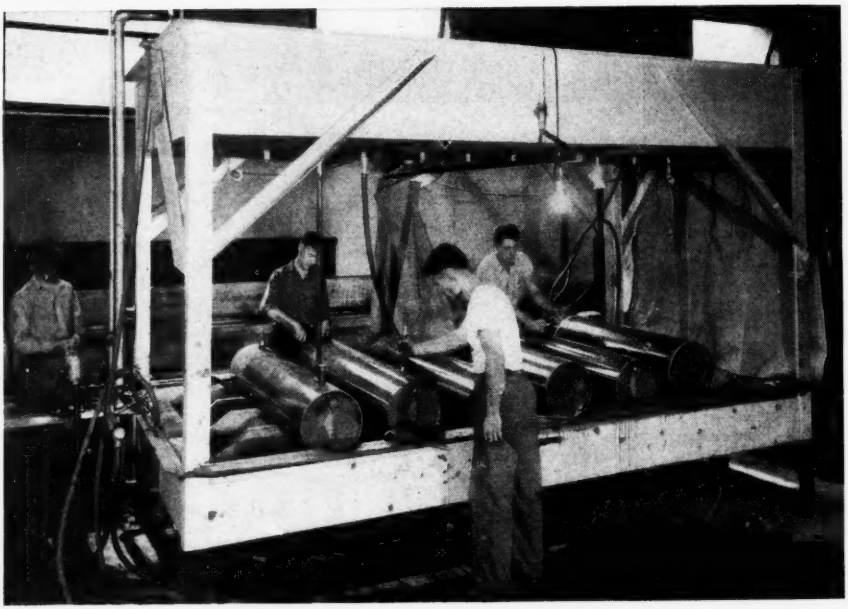

Fig. 13—On the testing rack shown here, the tank's welded ends are examined with special care.

UDYLITE

AUTOMATIC PARKERIZING MACHINE

For

SMALL PARTS

- ★ Garand Clips
- ★ 20 mm. Links
- ★ 30 and 50 Calibre Machine Gun Links
- ★ Miscellaneous Machine Gun Parts

● The Udylite Automatic Parkerizing Machine will handle large quantities of small parts continuously through the entire parkerizing cycle, including all cleaning, rinsing, oiling, staining and drying operations. The machine is fully automatic. No manual operation is required. It can be equipped with automatic loading and unloading devices.

Parts are transferred from tank to tank in complete batches. Loads cannot become mixed in the machine.

Machine can be air or hydraulically operated. It is entirely self contained, compact, sturdy—constructed for low maintenance costs. Processing time can be varied to requirements. If you have a national defense contract which calls for parkerized finish on small parts this is the machine you should have. Our engineers can quickly estimate your requirements. We are in a position to make quick delivery.

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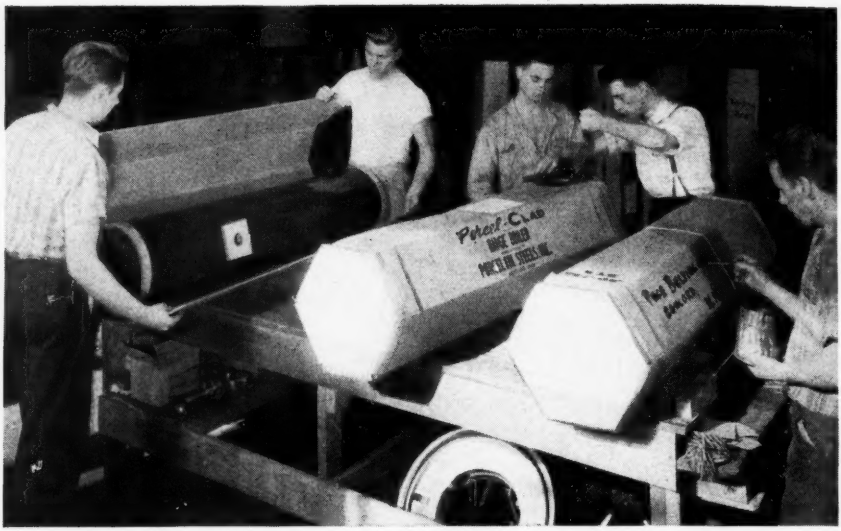


Fig. 14—The workmen shown in this illustration pack the finished enameled water tanks for shipping.

prepares the surface for the first coating of enamel.

An ingenious though simple device is used to hold the cylinder while it is being dipped into the receptacle which contains the liquid ground coat, as shown in Fig. 9. After dipping, the cylinder is placed on a drain rack shown in the foreground of this illustration and is then later removed to a drying compartment where the enamel coating is thoroughly dried prior to firing. Before firing, however, narrow edges around both ends are brushed to provide an area of bare metal against which the heads are to be welded on. The cylinder is then ready for its first firing.

The porcelain enamel ground coating is fused to the Armco Enameling Iron cylinder at 1,650 deg. F. in the box type furnace shown in Fig. 10. After the ground coating has been fired, the cylinder is once again carefully examined for possible surface imperfections.

Figure 11 shows a view of the finish coating of enamel being sprayed on. Special spraying equipment, such as extra length spray guns, provide the means for coating the inside of the cylinder thoroughly and completely. Following the application of the final coating of enamel, the edges are again brushed to remove enamel and provide an area for welding during assembly. Meanwhile, the tank heads have been given a ground coating of enamel, edgebrushed, fired, sprayed, edgebrushed and fired again. Soft, non-corrosive metal is cast into the spud channels after the porcelain enamel has been applied. The soft metal is later dipped and threaded to provide a watertight seal for pipe connections.

Figure 12 shows the actual position of the cylinder during the fabrication operation in which the heads are welded to the cylinder. A strip of glass cloth is placed between the tank cylinder and the heads as the heads are inserted into the cylinder. The heat applied by means of a weld-

ing torch fuses the glass cloth to the heads, thus making a watertight joint.

An important phase in the construction of the tanks is testing under pressure. On the testing racks shown in Fig. 13, the tank's welded ends are examined with special care. After the tanks have passed the pressure test, they are transferred to the shipping department shown in Fig. 14 where tough composition rubber "bumpers" are placed on the ends of the tanks during packing. These protect the heads from damage in shipping and improve the tank's appearance. Square sections of corrugated paper are used to protect the spuds. A 20-year guarantee tag, an Armco Enameling Iron label, and a set of instructions to plumbers are attached. Finally, the tank is packaged in a six-sided, 275 lb. test carton, marked with the name and address of the buyer and made ready for shipping.

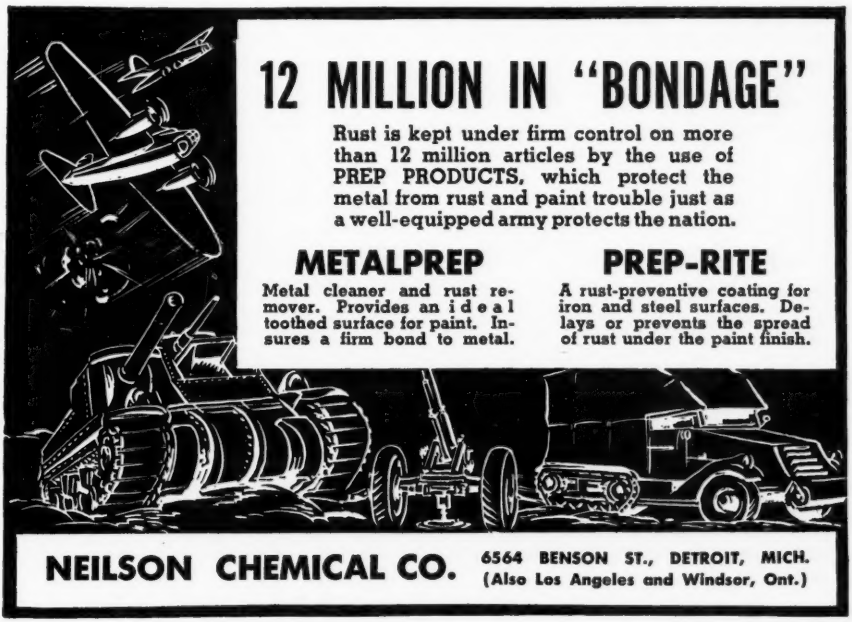
Alsop Hy-Speed Equipment for Liquid Processing. The complete line of Alsop Hy-Speed Portable Mixers, mixing tanks, storage tanks, and filtering equipment is contained in this 36-page catalog which is now being issued by the Alsop Engineering Corporation, 8 Bright St., Millsdale, Connecticut.

In the front section of the catalog, the many unique improvements which have been made on Hy-Speed Propeller Type Agitators are illustrated and described. Many models designed especially for unusual applications are shown as well as universally adaptable models embodying some of the most modern construction details and principles.

Also included in the catalog are the Sealed Disc Type Filters. Their advanced design is said to make available maximum filtration surface and, consequently, speed and capacity.

Copy will be sent free upon request.

"Sturaco" Machinery Oils & Greases. A 20-page booklet covering in detail the utility, features, and so on, of "Sturaco" Extreme Pressure Machinery Oils & Greases is now available from the D. A. Stuart Oil Co., Ltd., Chicago, Ill., free upon request.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Barrel Finishing o

The Importance and Application of the Basic Factors as Applied in Barrel Finishing Practice

By H. LEROY BEAVER

Barrel Finishing Consultant
Lansdale, Pennsylvania

FROM time to time during the period of this series inquiries have come both to the author and publisher as to whether it was quite necessary for a discussion of barrel finishing procedure to be extended over a series of four or five years. The inquirers seemingly forget that in most if not all of the papers in the series the basic factors have been discussed as respects their application to barrel procedure and from time to time it was suggested that these factors were underlying and were not of necessity confined to the treatment of metal products in barrels, but had their proper application in metal finishing procedure generally. In other words, our approach to and discussion of the various factors had an intent more far reaching than their simple application to barrel finishing which is but a single phase of the surface treatment of metals.

Any research, whether in the matter of metals or any other products is generally mapped out to follow certain lines, but invariably there are a host of ramifications met with all along the line which require exploration and examination. In following this procedure, we continually uncover factors that while not especially interesting with respect to their application to barrel finishing solely, they are interesting when regarded in the light of the treatment of metals by some other method or methods.

Such items for example as the observation of cleanliness and the best manner of approaching this phase and its treatment; the necessity for the use of the proper materials for specific applications; the importance of properly designed equipment; the advisability of adopting new techniques, and many others are but a few of the phases that have been discussed in the course of the series, all of which would have apt applications in just about every form of metal finishing procedure.

In one paper we discussed at some length the use of soft rubber linings vulcanized to the inner surface of barrels where cutting down operations were carried on with sharp cutting abrasives and water, and we gave some statistics as to the comparative life of such rubber lined barrels as distinguished from the conventional cast iron or sheet steel shell barrels, and with reference to

the comparison in weight of steel shells rubber lined as compared with unlined cast iron shells, and the factor of operating with heavier loads of materials at far less operating cost per load. The reaction to this discussion still continues and the average reader of the series would be surprised to know how many reports we have had on the effectiveness of such rubber lined barrels.

The point we wish to stress however, is that quite apart from this application in barrel finishing there were readers who sensed entirely different applications. We will mention only one, that being the case of the superintendent of a department where small sand blast machines were used on a wide variety of small parts. His complaint was that he had continual trouble with the bends and ells on the sand conveying lines cutting through and requiring almost constant replacement, but he at the same time sensed that if soft rubber liners would withstand continuous use with abrasives then perhaps if packing hose were to be substituted for the ells and bends on his sand

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BUFFERS

Paramount considerations in selecting a buffer are correct wheel speeds and ample motor power. The Selective Speed Marschke Buffer shown here provides 3 HP to 5 HP in three speeds, to take care of a wide range of metal finishing requirements. Ball bearings, spindle, and every other detail of design have been combined with highest quality of materials and workmanship to give you years of dependable production with little maintenance expense.

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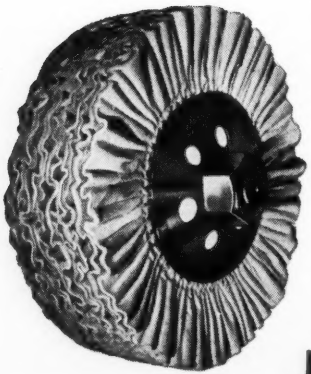

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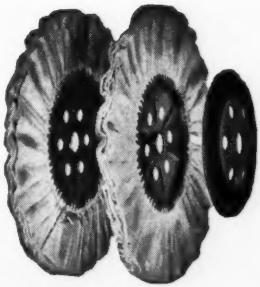

WEARS TWICE AS LONG • COSTS HALF AS MUCH

UF CORPORATION

LONG ISLAND CITY, N. Y.

Island C York, has rights to U. S. Patent Nos. Re 19,894 and 2,140,208 having the admission of air through the sides of the buff. Owner protect and stop infringement.

blasts that the same results might be obtained. This he tried and while this subject was discussed about three years ago, the original packing hose installed on his machines is still in service with no signs of failure.

Similarly at one time and another during the series we have discussed the question of soap and its application to metal finishing. The best basis soaps to use and the necessary alkaline builders to be used to control certain water conditions. The question of the pitting of metal parts in process due to an excess of organics in the water supply and the almost ridiculously simple solution of this troublesome factor has been another factor where while the solution was applicable to barrel procedure, it was equally so in every other metal finishing phase wherein water with this condition was encountered, and the letters commenting on this phase and the results obtained have been among the most numerous of the entire series. We understand that since this paper was published the manufacturers of several of the commercial cleaners have added the material suggested to their formulas to control just this pitting condition.

All along we have tried to stress as strongly as we could the importance of knowing the water supply, not merely checking two or three times each year, but at least monthly and preferably weekly. So many failures in plating procedure can be traced to a lack of understanding of the importance of water analysis and so very much poor barrel finishing results can be traced to the same source that it has been a constant wonder to your author that some one or more of our more important cleaner manufacturers have not brought out a simple water checking test set. The technical equipment required is more than simple consisting of one oil sample bottle, a 100cc dropper bottle and one pint of standard soap solution, the overall cost of such a set not being in excess of 50 cents, and yet its importance goes far beyond any consideration of its cost.

The application of such a set, with precise directions as to its use and the accepted method of correcting whatever water condition it disclosed has been discussed at some length during the series, and the readers should be sufficiently familiar with it that we do not deem it necessary to repeat it in this summary. We wish that we might be able to in some way stress the very great importance that the water supply bears to the best metal finishing values but maybe it might be sufficient to say here that we have had literally hundreds of cases and among them the most stubborn and where barrel finishing results were less than mediocre, where the water supply was the sole fault, and with its correction by proper chemical additions, the final results were all that could be wished for.

In the matter of abrasives and the selection of the most accepted type for application to the various metals, these discussions required long study and experiments to determine just what mineral or combination of minerals functioned best. These we finally segregated and listed according to their hardnesses with relation to Mohs' Scale of Mineral Hardness. While it is true that the recommendations were made with respect to these applications in barrel finishing, the same values can and are being used by makers of various types of compositions used with buffs and other kinds of wheels in metal finishing practice.

The matter of barrels of various kinds and their application has been quite completely discussed and through it all we have tried to stress that our most important barrels had

HITTING THE NAIL *almost*
ON THE HEAD IS NOT ENOUGH
WHEN RESULTS COUNT

There's a job of carpentry to be done. You have two alternatives. Buy a hammer. Or hire a carpenter. Engineering a finish to your production requirements is far more complex than that job of carpentry. But the principle is the same. When it's important that the nail be hit EXACTLY on the head let an expert do it. And in the matter of finish, an exact hit IS important. The RIGHT finish will cut your finishing time, reduce your finishing costs and enhance the salability of your product. Your inquiry incurs no obligation. Address Department L.

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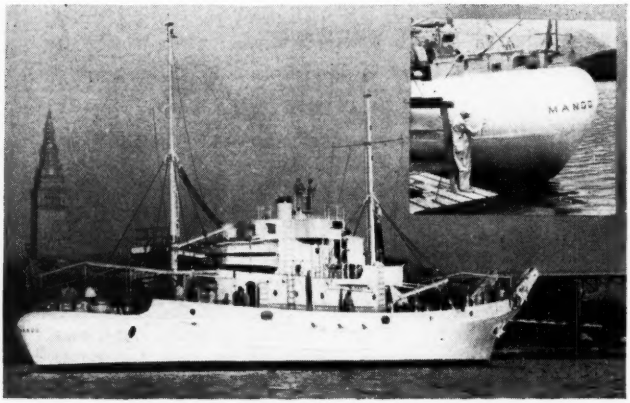
their inspiration in what are commonly termed laundry wash wheels. We have several times suggested that it might be well if most barrel operators would visit their local laundry from time to time to gather some information as well as inspiration to guide them in their application of practically the same procedure on metals that the laundryman uses on fabrics. We have done this and continue to do it and many of the most important phases of barrel finishing that we have uncovered have had their inspiration in something in the way of materials or procedure we have noted in laundry applications.

Sometimes your author cannot help but feel that we in the metal finishing field are prone to adopt something of a "know it all" attitude, and while it might result in a hurt in our ego, at the same time any reader who will take the time to make a "social call" on his laundryman, will learn much that will be of value. Suppose we cite just a single instance of what we are trying to develop for you. We know of cases where operators of tubbing machines, so called, that is where the barrel is revolved in a tub or tank of water containing soap solution as a lubricant, and where this solution is changed in some cases only one each week, in others perhaps twice. What would you think of a laundryman who washed the clothes of all comers in the same tank of water for a whole week, or for that matter even a whole day. You would certainly feel that cleanliness was not a prime consideration, and yet barrel operators will operate a machine in just that way and where each lot of parts is churned about in a water solution just one shade more contaminated than the preceding load.

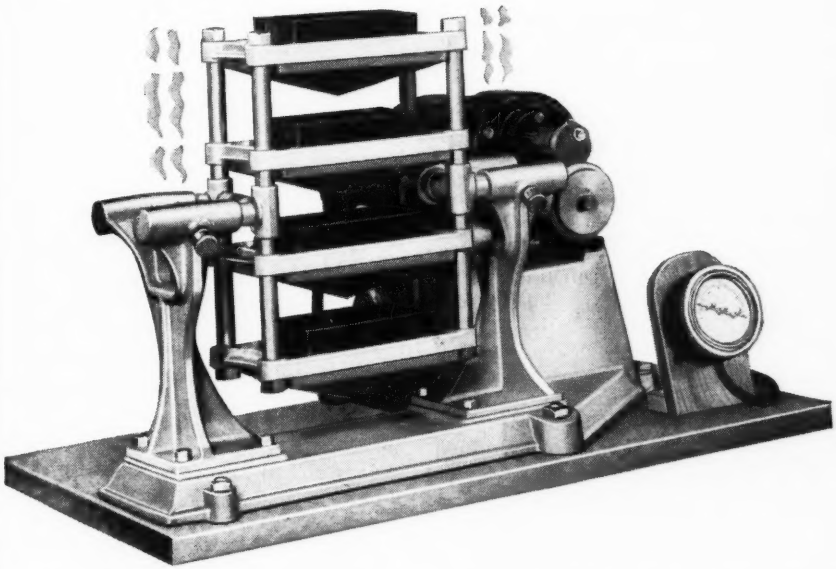
When trouble develops they are careful to write and explain that they operate under conditions of the utmost cleanliness, but in visiting their establishments just such things as we have described are very quickly uncovered. The average wash wheel load is soaped and rinsed at least twice and sometimes three times and the last rinse is followed by a sour to neutralize any excess of alkali, but the resulting product is clean. We very much fear that as much cannot be truthfully said of much of the products coming from burnishing barrels as they are ordinarily operated.



IN SHIPYARDS throughout the country, spray painting speeds the production of everything from dreadnaughts to dinghies. For instance, the Cleveland and Lorain, Ohio, yards of American Shipbuilding Company are busy turning out Class Y N Net Tenders, the ships that lay great meshes of cables to trap submarines.

(Photo Courtesy DeVilbiss Company)

HAVE YOU HEARD ABOUT THE "SHAKE-UP" IN OUR POLISHING GRAIN DEPARTMENT?



● This "shake-up" takes place every day, and its purpose is to make certain that every batch of Aloxite Brand Aluminum Oxide "TP" Polishing Grain will be absolutely uniform in size. Because that's the grain that speeds work, improves results and saves you money.

In our control laboratory, a battery of special sifting machines is constantly "shaking up" specimens of "TP." In fact, a sample from every batch must undergo careful grading on this series of rapidly vibrating test sieves.

As a result, you can count on each individual grain to do its full share of work. There'll be no over-sized grains to mar or scratch, no under-sized grains or slivers to slow cutting action. You get a better finish in less time and at lower cost.

Be sure to remember the name "TP" when you order.

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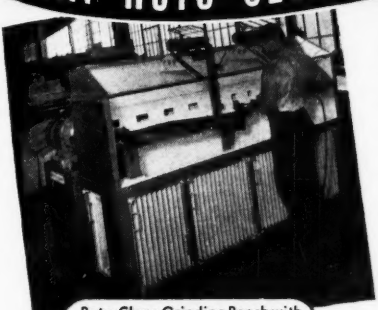
And then, with respect to cleanliness. We have tried to impress on our readers among whom we know are hundreds of barrel operators who have written us directly with their problems, that if there is any place where "Cleanliness is next to Godliness" it must lie in barrel finishing procedure. If we could feel that our preachment on this phase of barrel finishing has been heeded and that operators generally are at least trying to observe a condition of greater cleanliness, then if everything else in the series were to be disregarded, we would still think that the series, as a whole, has been well worth while the effort required in its preparation. So we would again stress this plain fact that no operator can place dirty or greasy parts in his barrel and expect to obtain satisfactory results. A combination of burnishing barrel and cleaning tank we consider as well nigh impossible, and if it exists, we must confess that we have never seen it in operation.

Now as to the various steel burnishing materials used in barreling processes. Long ago we determined that no round ball could burnish into an angle however obtuse, or into a groove smaller than its own diameter, and the attempt to accomplish this feat simply rendered much of the barrel finished parts to be considered as only partially done, the remainder having to be accomplished by polishing. Back in 1924, we commenced the development of a line of formed steel burnishing materials starting with Pebs and progressing through Diagonals, Diamonstels, Balcones and Finbals, each of which were designed in such a way that some one of them or a combination could be fitted to parts to be processed and predetermined assurance could be had that every part of the surface to be finished would be covered. Up to 1937 a survey showed that of manufacture and sales of formed pieces as compared with round balls the proportion was about 24 per cent of formed parts to 76 per cent of round balls. During the five years in which this series has run, the complexion of the use of formed materials vs. round balls has changed materially, and a check-up for the close of 1941 shows that now about 67 per cent of material made and used is formed and only 33 per cent consists of round balls.

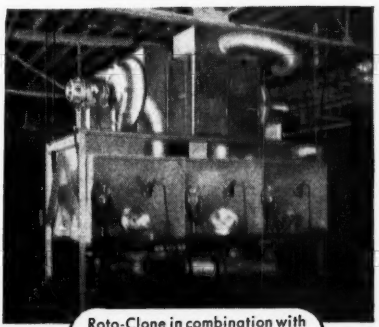
We know now that it is the resistance of the resultant force developed within the burnishing mass to the parts seeking to pass through it that produces our typical barrel finishes; that this resistance is far more easily obtained with formed pieces which have an interlocking tendency as distinguished from round balls which offer the least resistance, and that deformation of parts in process are not for the most part caused by excessive load, but rather almost invariably by excessive barrel speeds. Generally speaking, one of the outstanding results of this series has been in a development of a better understanding of using slower barrel speeds.

That barrel finishing procedure has its place in our present program for national defense in the speeding up of production, and perhaps just as important in its relation to the problems of substitution and conservation of strategic metals, is more than evidenced by the fact that our largest producer of metallic burnishing materials has sufficient orders on their books that if they operated on a twenty-four hour basis would take them well into 1943. All of the useful factors of barrel finishing as they relate to national defense procedure have long since been submitted to The National Inventors Council, for such action as they may deem pertinent and such recommendations as

AAF ROTO-CLONES FOR NATIONAL DEFENSE



Roto-Clone Grinding Bench with Airmat PL after cleaner for finishing Airplane propellers.



Roto-Clone in combination with AAF filters thru which cleaned air is returned to the workroom.

Roto-Clones like those assembled above for shipment to new industrial buildings and foundries, give some idea of the important part that dust control plays in National Defense. In plants where tanks, planes, trucks, guns and shells—in fact wherever the countless defense materiels are made—clean air plays a vital role in keeping production lines moving at unprecedented speed.

Men who operate machines must breathe freely of clean, wholesome air, and those machines must be protected from the ravages of abrasive dusts that deteriorate the best of equipment or break down accurately finished surfaces.

American Air is proud of the part it is taking in the National Defense effort—AAF air filtration and dust control equipment delivered to manufacturing plants directly engaged in making war materials comprises approximately 92% of our output.

For more than 20 years the American Air Filter Company has pioneered the development of air filtration and dust control and is today the world's largest manufacturer of equipment to eliminate dust. Bulletins describing the various products are available on request. Please address 224 Central Avenue. Canadian companies write Darling Bros., Ltd., Montreal, P. Q.

THE SYMBOL AAF OF CLEAN AIR

AMERICAN AIR FILTER COMPANY, INC., LOUISVILLE, KY.

they should make both to prime contractors and sub-contractors working on defense production. Should any of the readers of this series be engaged in defense production and require assistance in connection with any of their barrel finishing operations they may feel assured that their problems will be given immediate priority of study and recommendation simply on their statement of the operation they wish to perform from which we are generally able to suggest the proper and best barreling procedure.

"The Airless Wheelabrator — What It Is and What It Will Do," a 16-page informative pamphlet published by the American Foundry Equipment Co., 555 S. Byrkit St., Mishawaka, Ind., concisely answers every question about the Wheelabrator—a simple mechanical unit that utilizes controlled force instead of compressed air for abrasive blasting.

Questions 1 and 2, "What Is the Wheelabrator?" and "How Does the Wheelabrator Work?" introduce with interesting facts, detail and illustrate the Wheelabrator principle and mechanism. "What Will the Wheelabrator Do?" is answered with an imposing list of the diversity of applications of the unit. These range from its primary purpose, the cleaning of metals, to the graining of lithographic plates.

The range of Wheelabrated metal finishes which is possible with the use of the various sizes of steel shot and grit is shown in a series of magnified illustrations with suitable descriptions. A partial list of the multitude of products being Wheelabrated, both defense and general, and a few of the 1,300 Whelabrator users are included to illustrate the versatility and acceptance of the Wheelabrator in industry.

Complete sizes of the three types of blast cleaning machines in which the Wheelabrator is offered — Tumblasts, Tablasts, and Special Cabinets — are illustrated and described. The American line of dust collecting equipment used to ventilate Wheelabrators is also presented. A number of testimonial letters from owners of Wheelabrator equipment outlining the value of their machines for various applications answers the important question, "What Do Users Say About Wheelabrator Performance?" Copy of pamphlet free upon request.

Perry's "Chemical Engineers' Handbook." The second edition of Perry's "Chemical Engineers' Handbook" is now being issued by the McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York City. The price is $10.00 per copy.

Perry's "Chemical Engineers' Handbook" is one of the best standard reference works for all the chemical engineering profession and for all whose work in industry or engineering touches on this field. In the 3,029 pages of this well-known handbook are collected, classified, reduced to usable form, and made instantly available thousands of facts on essential theory and standards, practice, and data in every branch of chemical engineering.

This book can be used to check up on methods, to get quick answers to current problems, to save time and effort, to simplify work, and to keep work in line with highest professional standards.

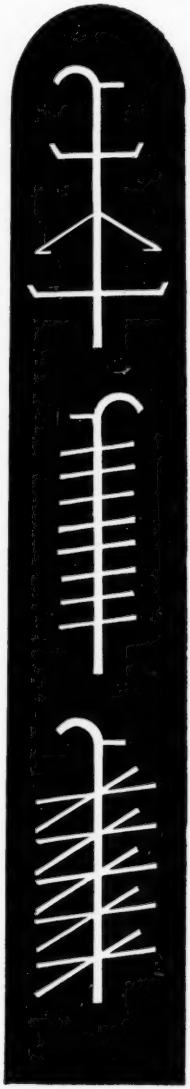
Approximately 1,030 pages are devoted to mathematical, physical, and chemical fundamentals and data, 1,060 pages are devoted to data and practice on unit processes, 740 pages of important engineering information, and 129 pages are devoted to business and professional subjects. In addition, a 70-page quick reference index is provided. Further information on Perry's "Chemical Engineers' Handbook" can be obtained by writing to McGraw-Hill Book Co., Incorporated.

Weldon Roberts Brightboy Leaflet and Price List. The wide application of Weldon Roberts "Brightboy" Soft Rubber Light Abrasives for pre-polishing and finishing many types of metals is described in both an illustrated leaflet and price list (No. 53) now available from the Brightboy Industrial Division, Weldon Roberts Rubber Co., Newark, N. J. Brightboy is made in a number of sizes in wheels and discs for use on lathes, as well as in sticks and tablets for hand work.

Grits and Grinds, Vol. 30, No. 2. This edition of Grits and Grinds, published by the Norton Company, Worcester. Mass., features an interesting article on oil as a grinding lubricant and coolant. In addition, the publication includes an illustration and description of the largest grinding machine ever built in a Norton plant. Questions and answers pertaining to the advantages and uses of "Speed-Wet" abrasive paper are also given. Copy free upon request.

WAXKOTE

FOR PLATING RACKS AND MASKING



WAXKOTE is a new type electroplating insulation highly recommended for coating plating racks and as a stop-off material.

NO PRIORITY REQUIRED

WAXKOTE is manufactured from an abundant supply of raw materials that require no priority.

WAXKOTE FEATURES

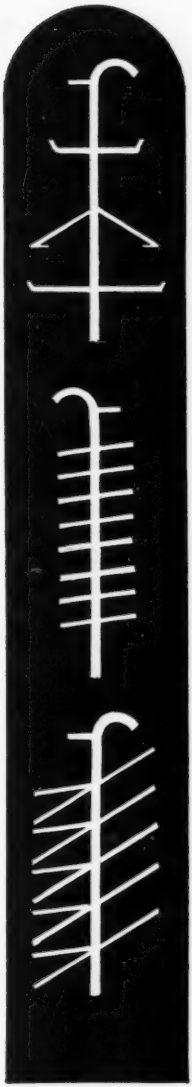
WAXKOTE can be had in any quantity without priority.

WAXKOTE is a solid material and is applied by melting and dipping.

WAXKOTE is faster to apply. It requires no drying—it hardens instantly. When dipped, a rack can be prepared and in the plating solutions in five minutes' time.

WAXKOTE is adhesive to all metals—no sand blasting or taping required. Racks can be moved from one solution to another with no danger of carry-over, as no pockets can form. Racks can be prepared and back in service in five minutes.

WAXKOTE is guaranteed to resist all plating solutions and cleaners including chrome, nickle, high-speed copper, cadmium, zinc and tin, and is highly recommended for anodizing.



DETROIT RACKOTE CO.

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New Electron Microscope Studies Finishing Problems

Permits Magnifications Up to One Billion Times Area of Sample

IT was nearly 300 years ago that a Dutch merchant named Anthony van Leeuwenhoek saw for the first time the vast new world of the infinitely small which his original microscope revealed. His eyes would no doubt start from his head if he could peer through the Electron Microscope at the Research Laboratories of Interchemical Corporation, parent company for Ault & Wiborg Corporation, where magnifications of 100,000 diameters are now being made with the amazing new tool of science.

Its application in the finishing field and in allied industries are thought to be far-reaching. But to start at the beginning, just what is the electron microscope?

As the first microscopes became more generally used, it became evident that there were many things too small to be discerned even by the finest instrument. There was one limiting factor which the skill of the designer and the knowledge of the physicist, could not overcome. That factor was light—the range of the spectrum.

Now comes the electron microscope. It is based on a principle which does not depend on visible light, but rather on a new branch of

Fig. 1—Illustration showing electron microscope in use.

physics commonly called "electron optics." This is founded on the knowledge that light and electron beams behave similarly under certain conditions. Using this fact, the electron microscope has been constructed, utilizing a beam of electrons rather than light rays. The source of the beams is a cathode tube, like the ones in a television set. By combining two electronic "lenses" magnifications of very high power are possible.

The electron beams act as very short wavelengths, in fact very much shorter than wavelengths of visible light. It might be said that they can search out tiny objects which the larger, clumsier light rays would obscure. The electron microscope permits 50 times the resolving power of the very best light microscope. Magnifications one billion times the area of the object magnified are now being made with Interchemical's new instrument, using 60,000 volts.

The electron microscope doesn't look much like a microscope. It is taller than a man, with a long tube extending down in front of an instrument panel. A film of pigment, varnish, dyestuff or whatever is to be magnified is placed on the fine meshes of a tiny screen disk about an eight of an inch in diameter. The screen is inserted in an aperture in the tube, which is closed up again to form an airtight chamber.

A vacuum is created inside the tube, because the electron beam will not pass through any substance—not even through air. The beam, controlled by a maze of vacuum tubes in the back of the instrument, passes through an electro-magnetic magnification system forming an image on a fluorescent screen. This may be examined through a series of glass covered holes and the particles in the collodion film are visible, blown up thousands of times. The image may be photographed and the photograph

Fig. 2—Illustration showing the preparation of specimens for viewing by the electron microscope.

enlarged to produce still greater magnification, though, of course, no more detail is added by this enlargement.

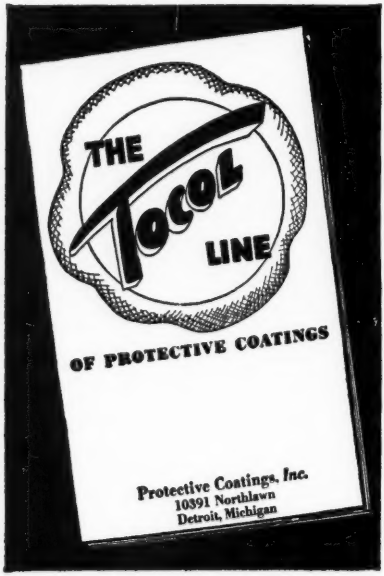
Interchemical expects the electron microscope to have many important uses. It will open up a new world of study by making it possible to examine with much greater clarity the structure of pigments. Thus the character of printing inks, industrial finishes, textile colors, dry colors, and similar materials may be determined and observed in Interchemical's Research Laboratories with a scientific accuracy which was never before possible.

The electron microscope was made by RCA, and there are several of them in industrial laboratories and at various universities such as M.I.T. and the University of Michigan.

The electron microscope is so new that its full potentialities can only be estimated. However, the microscope, in the 300 years since its invention, has made such important

contributions to science that it might be called the keystone of research. Since the electron microscope broadens 50 fold the sphere of microscopic observation, its effect on scientific investigation is bound to be tremendous.

"The Tocol Line" is the name of a booklet now being issued by Protective Coatings, Inc., 10391 Northlawn, Detroit, Mich. It is stated that this is a limited edition containing complete information about and description of all of the items in the Tocol Line of protective coatings, including synthetics, specialties, rubber, and so on.



The Tocol Line Protective Coatings Booklet

"Finishing Suggestions," a six-page bulletin announced by the Sundstrand Machine Tool Co., Rockford, Ill., contrains illustrations on the use of the Sundstrand Hi-Speed Sander, with suggestions as to abrasives and methods found most suitable in performing various metal finishing operations.

"A Primer for Industrial Exhibitors." Industrial and trade exhibits form an important part of the advertising and promotional effort of many advertisers. Now comes a book, "A Primer for Industrial Exhibitors," written in easy "how-to-do-it" style which should prove of inestimable value not only to novices in the business of using exhibits but also to old hands at the game. Among the topics discussed are: how to select the right show, how to choose exhibit space, how to promote attendance, how to ship and set up the exhibit, how to operate it, how to dismantle it, and how to follow up prospects after the show is over. Convenient check lists, to guard against overlooking any important detail, are included as are forms which have been in actual use.

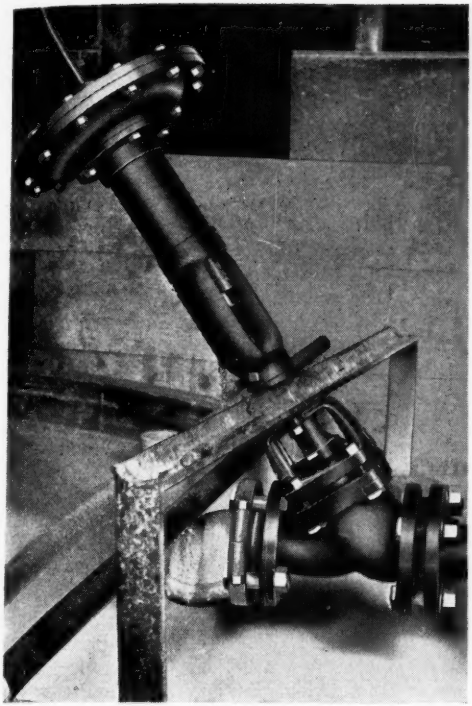
The author of the book is a committee of practical men thoroughly experienced in the field of industrial exhibits and all members of the Association of National Advertisers, Inc. The committee consists of J. F. Apsey, Jr., The Black & Decker Mfg. Co.; T. K. Almorth, Owens-Illinois Glass Co.; W. H. Beckwith, Royal Typewriter Co.; J. S. Holl, Link-Belt Co.; A. W. Jones, Standard Gas Equipment Corp.; R. P. Kelley, The Timken Roller Bearing Co.; C. R. Moffatt, United States Steel Corp. of Delaware; C. W. Ruth, Republic Steel Corp.; and H. H. Simmons, Crane Company.

This committee of the A.N.A. has been working steadily for a number of years to improve shows as a profitable promotional medium. A wealth of experience resulting from years of exhibiting in hundreds of trade shows has been assembled and epitomized in this volume.

The "Primer" is a "must" not only for those charged with the supervision but also for those responsible for the operation of exhibits. It is not designed solely for the benefit of manufacturers selling primarily to industry but will be useful as well to those who display at shows of various types.

The book, which consists of 64 pages, is printed on high-grade stock in large legible type. Copious marginal headings enable the reader to spot pertinent topics at a glance. The book is carefully cross-indexed and replete with check lists and illustrated appendices.

The association of National Advertisers has authorized the distribution of a limited number of copies to non-members at a nominal price. Further information may be obtained from Headquarters of the A.N.A., 330 W. 42nd St., New York, New York.



Air-Operated Durichlor Y Valve used for quantity control of hydrochloric acid.

Mechanically Operated

DURIRON and DURICHLOR VALVES

Automatic control of the flow of corrosive solutions is being accomplished with Duriron and Durichlor valves equipped with air-operated diaphragm motors. The motors can be actuated by connecting with either indicating or recording temperature controls, or by remote manual control.

A typical installation is made on chromium plating work with one valve spring-opening and one spring-closing, directing the flow to either Duriron heaters or coolers. One valve or the other is open at all times as operating conditions require. There are many such installations in daily use where the temperature variations are held to plus or minus 1° F.

Other installations have been made with remote control for filling acid carboys from distant storage tanks.

Various types of valves are available for operation by motor or other mechanical means. For types of valves made in *Duriron, Durichlor* and *Durimet,* write for Bulletins No. 601 and No. 604.

Let us know your requirements and we will send you our recommendations.

The DURIRON COMPANY, Inc.
DAYTON, OHIO

Bonderizing Large Metal Enclosures Reduces Handling

MOST extensive research in the electrical field has given Westinghouse a leading position in the development of outstanding devices for the economical production of electrical power for driving the wheels of industry, as well as the equipment for safely and efficiently handling this magic force.

Research has enabled Westinghouse to change guesswork to facts, and put facts to work, for the benefit of power users everywhere. Switchgear is only one of the many Westinghouse developments that harness electrical power to the service of industry.

Instead of the old-fashioned "open-faced" switchboard, all the necessary switching apparatus is mounted in a scientifically designed metal enclosure, or enclosures, engineered for large plants or small ones, completely assembled, ready to hook up and put into operation. In these enclosures is mounted all the necessary circuit breaker equipment needed for the control and protection of electrical circuits.

Among the many points stressed by Westinghouse is the installation economy provided by complete factory assembly and testing; complete safety to attendants—all live parts shielded; minimum maintenance, unexcelled operating reliability, and easy mobility.

At the Westinghouse plant in East Pittsburgh more than half of one of the longest manufacturing aisles in the world (1,660 ft.) is devoted to the assembly of metal-clad switchgear. Unexcelled capacity and facilities for assembly testing and handling, by highly skilled workmen, make Westinghouse metal-clad switchgear outstanding in design and performance.

An important feature is the durable finish applied to the metal enclosures. To make sure there

Fig. 1 — A general view of the Bonderizing department showing five tanks used in the Bonderizing process.

For Faster Polishing on Defense Jobs

You Can Depend on ALUNDUM ABRASIVE

THIS finishing operation on airplane motor connecting rods is typical of the thousands of polishing jobs in the defense industries that are being speeded with Alundum Abrasive.

For the first roughing operations, using sizes 90 and coarser, there is the new Alundum "S" Abrasive with its better "sticking" power and longer-lasting cutting action. For the finishing operations there is Alundum "R" Abrasive for bonding with glue and Alundum "B" Abrasive for use with cement. Each abrasive is especially designed to do its particular job—and do it faster and more economically.

Norton engineering service is ready to help with any polishing problems you may have—defense or otherwise.

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NORTON ABRASIVES

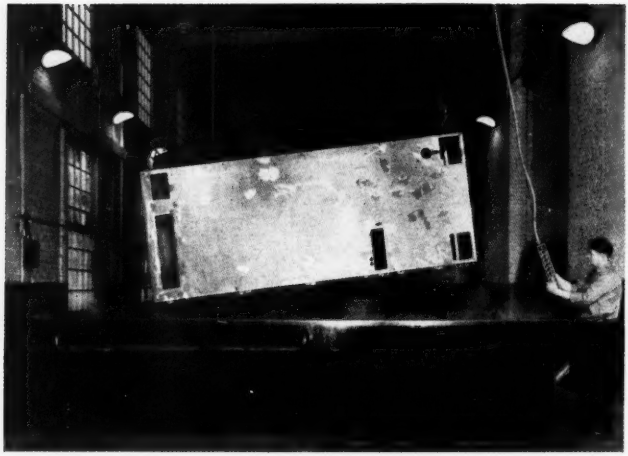

Fig. 6—A completely welded enclosure is being lowered into the first of five tanks used in the Bonderizing process. The unit is washed in a hot alkaline solution before being rinsed in hot water.

•

will be no finish failure in this long-lived equipment, the enclosures are Bonderized before they are painted. Bonderizing provides a rust inhibiting finish base and assures maximum adhesion of finish to the metal.

To make sure that the Bonderite coating will not be disturbed before the primer is applied, all welding operations are accomplished before Bonderizing. The completed enclosure is then Bonderized in a huge tank, big enough to take in the largest completed enclosure, properly rinsed, dried, and then given the first coat of paint. Some idea of the size of the Bonderizing tank can be gained from the illustration Fig. 3 shown herewith. At this point the various pieces of equipment are assembled in the enclosure, after which the whole job is finished in the final color.

"Industrial Brush Bristles Made of Du Pont Nylon" is the title of a 16-page booklet being issued by the Plastics Department of E. I. du Pont de Nemour & Co.

The booklet gives a short history of nylon, outlines its advantages, reports on its use in the electroplating and other industries, and lists its general physical and chemical properties. Copy free.

•

Fig. 3 — The proper Bonderizing surface results from immersion in this tank containing the Bonderizing solution. The enclosure is being lifted and will be rinsed and then "sealed" in a tank containing hot chromic acid before it is ready to be painted.

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others 4 to 1
...handle BIGGER PAYLOADS

Monel pickling baskets boost production. Use of light-weight welded construction conserves strategic materials.

In the defense industries, with the ever present material shortages, it is no time to bank on pickling baskets that won't stand up. That's why it's more important than ever to use Monel. Tough, wear resisting Monel takes the hardest kind of knocks and comes back for more. Light-weight welded Monel construction means less basket and more payload...saving time and speeding production. Consider the Monel baskets shown above as built by Rolock Inc., Southport, Conn. Used for pickling brass, steel and bronze screws in a 90% solution of 20 Be¹ muriatic acid, each handles a 150 pound load. Replacing steel ones these Monel baskets have lasted four and a half times as long and are still going strong. Learn how you can take advantage of light-weight Monel construction. Write for more information. Address:

In recognition of outstanding achievement in producing for National Defense, the Navy Ordnance Award was presented to the Huntington Works of The International Nickel Company, Inc., on August 13, 1941.

THE INTERNATIONAL NICKEL COMPANY, INC., 67 Wall Street, New York, N. Y.

"Monel" is a registered trade-mark of The International Nickel Company, Inc., which is applied to a nickel alloy containing approximately two-thirds nickel and one-third copper.

MONEL

Tom-Thumb Chemistry Discovers Invisible Enemies of Machines

FROM thimble-sized vessels of a "vest-pocket" chemistry laboratory have come clues to help defeat more than 100 invisible enemies of machines — spots which mar their metal surfaces and reduce their efficiency—Dr. E. Bruce Ashcraft, microchemist at the Westinghouse Research Laboratories disclosed.

These "Tom Thumb" tools of microchemistry have helped improve Westinghouse electrical apparatus, ranging from vacuum tubes to the world's largest power generators—the 1,000-ton machines now being installed at Grand Coulee Dam. Invisible things in the air, such as oxygen, water vapor; sulphur, salt ocean spray and oils, cause spots of rust, corrosion and tarnish on metal parts.

The tiny chemistry apparatus is a part of the Laboratories' microchemical section, established three years ago by Dr. Ashcraft. In this laboratory, tiny flakes of rust and tarnish are measured in millionths of ounces, samples so small it would take several hundred of them to weigh as much as an aspirin tablet. Since such small amounts would be lost in ordinary chemical apparatus, the tiny flasks, beakers, crucibles and test tubes are used. Acids and other liquids are handled with a medicine dropper.

Almost everything you can name has an outer film of rust, tarnish or other foreign material, either from invisible impurities in the air or from handling by human hands. With such metals as stainless steel or aluminum it is just such a film of tarnish, although it is very thin, that makes them stainless. Substances in the air combine with the metal to form a blanket of oxide or sulphide a few atoms deep which prevents further contact of the metal with air. But with iron, copper and other metals the thin films of tarnish crack and let in more air to react with the metal. This process of tarnishing and cracking continues deeper and deeper into the metal until rust has formed. The most common source of tarnish is oxygen in the air which combines easily with many kinds of metals. Sulphur, which gets into the atmosphere from the fumes of industrial furnaces burning coal, gas or oil, is another leading cause. The air also has a certain amount of water vapor in it, and near the seacoast, part of this vapor is from ocean spray, which contains chlorine, sodium, magnesium and other substances. In factories, fumes from welding and brazing operations add oxides of nitrogen, phosphates, chlorides and many other substances to the air.

When such elements in the atmosphere form tarnish films on electrical contact parts, they impede the flow of electricity in power switches, motors and generators. Just as carbon on spark plug points makes an automobile engine skip, the tarnish films make electrical apparatus lose power or stop operating entirely.

As an example of the work of microchemistry it was discovered that film spots interfered with the operation of vacuum tube filaments. Analysis showed that bits of silica, or glass, from the tubes' bulbs had deposited on the filaments. This experiment called for the use of water to dissolve some of the chemicals, but

extra pure water had to be distilled, because the ordinary distilled water used in the laboratory had been kept in glass bottles and had dissolved enough silica from the walls of the bottles to confuse the measurements of the silica in the film sample. This special water had to be stored in platinum bottles to keep it pure.

Facts revealed in the microchemical laboratory have suggested many different ways to prevent spots on metal parts of machines. To keep oxygen in the air from reaching metal surfaces, some machine parts were placed in containers of inactive gases, such as nitrogen and small parts were given the benefit of a vacuum devoid of all gases. Where these two methods were not practical, polished surfaces were coated with protective films of oil, grease or varnish. To prevent the corrosive action of sulphur, phosphates and other foreign substances, it was possible to remove these substances from the air with mechanical filters or with the Precipitron—an electric air cleaner developed at the Westinghouse Research Laboratories. Air filtering with the Precipitron has been used to protect motors in steel mills and other factories, electric contacts of automatic telephone switching apparatus and precision tools in machine shops and scientific laboratories.

Compressed Air Institute Trade Standards. The Compressed Air Institute, 90 West St., New York City, is issuing the fifth edition of its "Trade Standards" containing a wealth of technical information concerning rotary compressors and vacuum pumps, centrifugal compressors and blowers, compressor accessories, rock drills and pneumatic tools, reciprocating compressors, and so on, all of which assumes major importance in our national defense program.

Copies of Compressed Air Institute "Trade Standards" are available at $1.00 each.

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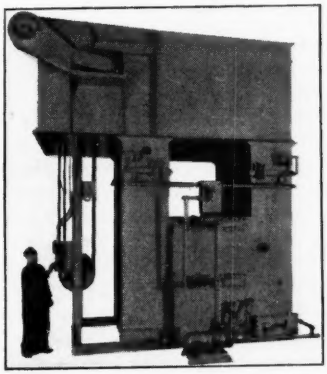

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New Plating Committee Shows Activity

COMMITTEE B-8 on Electrodeposited Metallic Coatings of the American Society for Testing Materials was formed on March 6 of this year at the Spring meeting of the Society in Washington, D. C., to take over most of the plating activities which had been carried on previously by several standing committees of the American Society for Testing Materials, and joint committees of the American Society for Testing Materials and the American Electroplaters Society.

At its first meeting it adopted for presentation to the Society two new specifications, A. S. T. M. designation B 141-41 T on "Electrodeposited Coatings of Nickel and Chromium on Copper and Copper-Base Alloys," and A. S. T. M. designation B 142-41 Ton "Electrodeposited Coatings of Nickel and Chromium on Zinc and Zinc-Base Alloys." It also adopted some changes in the specification for "Electrodeposited Coatings of Nickel and Chromium on Steel," which is now known as A. S. T. M. designation A 166-41 T. These specifications were approved by the Society, and have recently been published in the form of a pamphlet, together with the older plating specifications, A. S. T. M. designation A 164-40 T on "Electrodeposited Coatings of Zinc on Steel," A 165-40 T on "Electrodeposited Coatings of Cadmium on Steel," and A 219-40 T on "Methods of Test for Local Thickness of Electrodeposited Coatings."

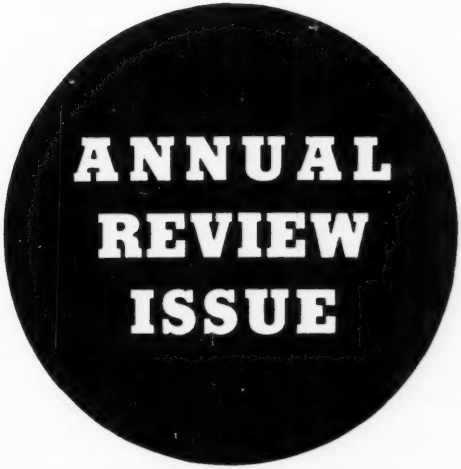
It is the hope of Committee B-8 that this pamphlet, which can be obtained from the A. S. T. M., 260 South Broad Street, Philadelphia, Pennsylvania, at 25c for single copies, will be used by all companies buying electroplated parts or doing electroplating. Any suggestions for revision should be addressed to the Society.

At the annual Meeting of the Society in Chicago held in June, a number of Sub-committees were formed to handle the variety of problems which come before the Committee. These Sub-committees are: Sub-committee I on "Specifications and Definitions," whose purpose is to study the need for, and write, new specifications; Sub-committee II on "Performance Tests," which will handle all the exposure work of the Committee; Sub-committee III on "Conformance Tests, which deals with determinations of thickness, porosity, adhesion, hardness, wear resistance and other quality factors: Sub-committee IV on "Electroplating Practice," which is to study the effect on quality of basis metal composition, polishing, buffing, cleaning, pickling, etc.; Sub-committee V on "Suplementary Protective Finishes for Metallic Coatings," which studies the additional protection obtained with coatings of oil, lacquers, passive films, and the like.

Immediately previous to the meeting of the Electrochemical Society, these sub-committees met in Chicago to organize the work. A number of Sub-groups were formed in each sub-committee, each sub-group being given one limited task to perform. There are a number of coatings used commercially which will be investigated, and it is hoped that these investigations will mature into new specifications.

The membership of the Committee is as follows: E. M. Baker, University of Michigan, Ann Arbor, Michigan—Chairman; E. A. Anderson, The New Jersey Zinc Co., Palmerton, Pa.—Vice Chairman; Gustaf Soderberg, The Udylite Corporation, Detroit, Michigan — Secretary and Chairman of

Coming in January



of PRODUCTS FINISHING

For Readers . . . Of unusual interest to all plant operating executives in the metal cleaning and finishing industry will be the January Annual Review Issue of PRODUCTS FINISHING. In addition to regular editorial features, important new developments of equipment, processes and supplies made for this industry during the past 12 months will be highlighted, making this number of special value to readers for frequent reference.

For Advertisers . . . This issue offers a forceful method of bringing news of equipment and supplies to PRODUCTS FINISHING readers. Take advantage of the added value of this Annual Review edition by scheduling your advertisement for appearance in this number...Send space reservation today!

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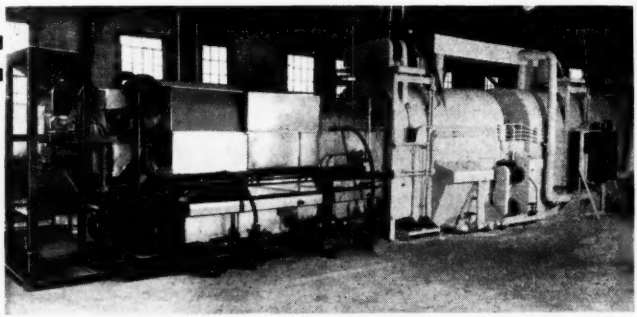

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The new Ransohoff Batch Finish Pickler, designed to speed up production, is satisfactorily meeting all demands in putting the final finish to .30 and .50 calibre cartridge cases. • The unit consists of three, patented, batch rolling or tumbling barrels in series; an acid roll, soap roll, and rinse and drying during discharge, all automatically controlled by master switch. • A Ransohoff Representative will help solve your cleaning and washing problem. Write today for Catalog.

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Porcelain Enamel Institute Continues Study of Technical Problems. The Annual Forum of the Porcelain Enamel Institute recently completed its sixth annual meeting at Columbus, Ohio. Two hundred supervisors, foremen and engineers were in attendance to discuss the practical operating problems of the industry.

The outstanding parts of the program were discussions on each afternoon covering respectively, spraying, job training, and peak production operations. Prominent members of the industry led the discussions.

The meeting closed with the opinion expressed that war conditions would force many technical advances in the industry, and that developments of an engineering nature will be rapid and effective.

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Containing a hard water corrective, Magnus 52BV keeps balls from scumming up. It is also exceptionally free-rinsing, so that you'll find the staining you are apt to get with ordinary soap chips will be completely eliminated.

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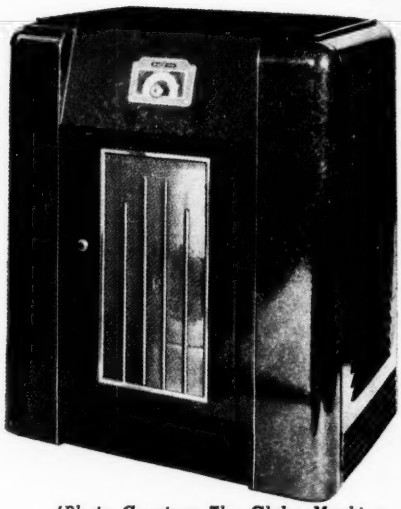


(Right) More in appearance like a console model radio is this Modern-aire oil burning circulating heater which has been finished in brown walnut Spatterloid baked enamel and trimmed with stainless steel.

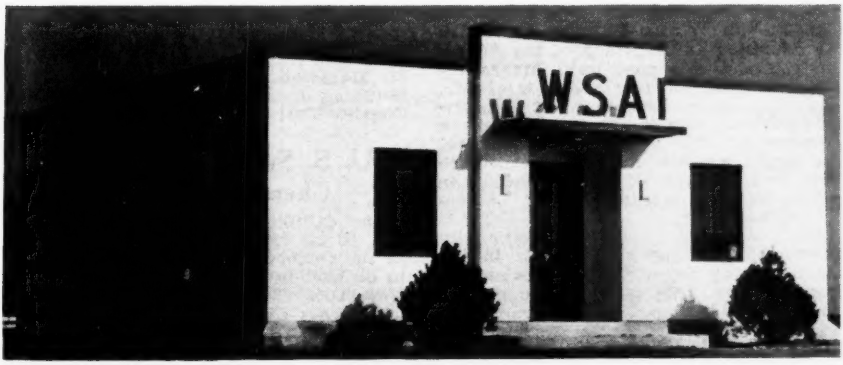
(Photo Courtesy The Globe Machine & Stamping Co.)

(Photo Courtesy Modern Packaging)

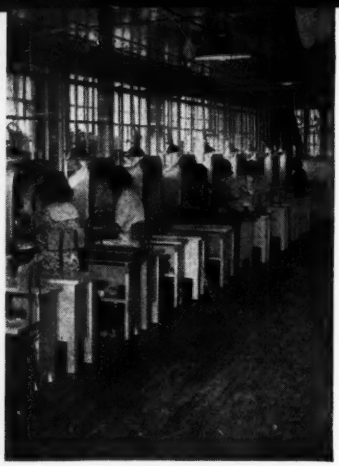
(Left) A varicolored lithographed finish enhances the attractiveness of this newly designed humidor tobacco can.

(Right) The "perfect breakfast wife" — Miss Ruth Ownbey, one of New York's loveliest models, was picked for this role by Manning Bowman salesmen at their convention in Meriden, Conn. Naturally, the "perfect breakfast wife" used a Manning Bowman chromium plated toaster, with plastic base.

(Below) The structure shown below has been an interesting topic of conversation among building men. It is a portable broadcasting station fabricated from Armco Paintgrip galvanized sheets. This is a special bonderized metal that takes paint readily and preserves the essential oils necessary for long paint life.



(Photo Courtesy American Rolling Mill Company)



News OF THE INDUSTRY

August P. Munning Passes

August P. Munning passed away recently at the home of his daughter, in Matawan, N. J., after several months of illness. He was 68 years old.

A. P. Munning was one of the outstanding figures of the electroplating industry of America. Born in Chicago, March 8, 1873, he entered the electrical industry at an early age, going with the Leonard Izard Co., who were then agents for the original Edison Co., in 1888. At a later date he joined the Cutler Hammer Mfg. Co. of Milwaukee, rising with them to the post of General Sales Manager, with offices in New York.

In 1911, Mr. Munning entered the electroplating equipment and supply business, organizing the Munning Loeb Co. in Matawan, N. J. In 1918 this firm was merged with the George Zucker Co. of Newark with Mr. Munning as president of the new concern, A. P. Munning and Co. In 1927 the latter company was merged with the Hanson and Van Winkle Company to form the Hanson-Van Winkle-Munning Co., with Mr. Munning as Chairman of the Board. He retained this post until his retirement in 1935. A few years later Mr. Munning again became active in the Hanson-Van Winkle-Munning Co. as a member of the Executive Committee. He again retired in 1940 to become President of the Matawan Bank, in which post he continued until his recent illness.

Mr. Munning was internationally known for his accomplishments in the electroplating industry. He was an Edison Pioneer. He was a strong supporter of the American Electroplaters' Society and an ardent believer in raising the standards of the industry.

Mr. Munning leaves his mother, Mrs. August A. Munning of Chicago; his widow, Mrs. Anna V. S. Munning; a daughter, Mrs. John A. Bauer; four brothers, Nicholas and Peter Munning of Matawan, and Joseph and Harry Munning of Chicago; and a sister, Mrs. Charles Thelen of Chicago.

August P. Munning

U. S. Stoneware Exhibit at Chemical Exposition

The exhibit of The U. S. Stoneware Co., 60 E. 42nd St., New York, N. Y., at the forthcoming Chemical Exposition to be held in the Grand Central Palace, New York City, from December 1 to 6, will stress the products of the Process Equipment Division, consisting of newly-

developed plastics, synthetic rubbers, synthetic resins, and so on, as follows:

"Tygon" Corrosion-Resistant Paint: Tygon Paint will be shown in a full range of colors. As recently announced, Tygon Paint is a modified halide polymer and possesses the greatest general resistance to corrosive attack of any known material. It is said to adhere perfectly to wood, concrete or steel, with amazing adhesion either air-dry or bake.

"Amron" Corrosion Resistant Paint: a new air-dry vinylite product possessing remarkable adhesion. It resists moisture and develops a mirror-smooth surface. Amron air-dries quickly into a hard durable finish. Available in all colors, including a rust-inhibiting primer.

"Duralon" Acid-and-Alkali-Proof Cement: A new self-hardening synthetic resin cement, recently developed, on which patents are pending. It will resist acids, alkalies and solvents at temperatures up to 350 deg. F.

"Plastite" Chemical Putty: A new waterproof, corrosion-resistant cement compound that remains plastic. Besides being recommended for general use around chemical plants, Plastite is being used for making tight joints in bell-and-spigot pipe connections, as a packing material for expansion joints, and for stopping gas and acid leaks at flanged joints.

"Neoseal" Cement: A new rubber cement material that comes in calendared sheets. Possessing good corrosion-resistance, Neoseal Cement makes an excellent packing for bell-and-spigot pipe and retains its resiliency for a long period of time.

"Tygon" Synthetic Rubber-Like Tank Linings: The many advances and improvements made during the past year by the Plastics Research Laboratory will be demonstrated through many commerical-sized Tygon Corrosion Resistant Tank Linings that will be on display.

"Resilon" Linings: Several new methods will be shown for securing better adhesion of Resilon Linings to tanks, vessels, piping, and so on. Larger sized sheets of Resilon will also be on display making for greater economy.

"Rubber-x" Linings: These are of the latex type and then can be applied at economical cost. Their low initial cost has appealed to many chemical and process plants.

Fans and Ventilating Equipment: Several standard fans will be shown, made with steel rotors and cast-iron housings, with all internal surfaces rubber-coated or lined with Tygon Corrosion Resistant Lining Material.

Stoneware Gate Valves: Chemical Stoneware Gate Valves in sizes from 1 in. to 4 in. All bearing surfaces are accurately ground and polished. The new spring-seating arrangement and the low packing pressure insure a tight seal along with smooth operation.

"Durite" Acid Proof Brick: The new low-cost, dense-bodied, well-shaped Durite Acid-Proof Brick recently developed by the Research Department will be on exhibit.

Chemical Stoneware Equipment: While the chemical and process industries have always used ceramic materials for much of their plant and laboratory equipment, the present shortage of many critical metals and alloys has brought chemical stoneware again into the limelight.

Chicago District Enamelers Club Pre-Holiday Meeting

A pre-holiday meeting will be held by the Chicago District Enamelers Club

"MAGIC" TACK RAGS IMPROVE YOUR FINISH 100%

MAGIC TACK RAGS remove specks, lint and sand particles--- bring out that deep, smooth luster, produce a faultless surface for white or colored finish. Why use "home made" tack rags when you can buy MAGIC TACK RAGS at trifling cost! They are tackier, do not dry--- are dust-proof and spontaneous combustion proof. Packed in dozen and gross lots or more. Made only by the

Wm. A. Juergens Co.
4036-40 Lagrange Street,
Toledo, Ohio, U. S. A.
If your dealer does not carry Magic Tack Rags, write us for sample.

on Saturday, December 6, 1941, at the Graemere Hotel, Washington Blvd. and Homan Ave., Chicago, Ill. The meeting will begin with a luncheon at 12 noon. The program for this meeting will be as follows:

Welding Practice for Porcelain Enameling, by Andrew Grierson, master mechanic, Norge Div. of Borg-Warner Corp. This subject, so important to enamelers, will be discussed by Mr. Grierson who, because of long actual experience, is capable of presenting worth-while facts. He has served a total of 10 years in the refrigerator field and prior to that time had charge of welding operations at the Ford Motor Company. Mr. Grierson will not only talk on welding for porcelain enameling but will offer ample opportunity for open discussion.

Examination of Welds by X-Ray Methods. This new application of the X-Ray for industrial purposes will be described by a representative of the X-Ray Diffraction Laboratory, General Electric X-Ray Corporation.

First Aid in Your Plant, by Jay G. Brown, American Red Cross. Mr. Brown will make a presentation on the subject of safety and first aid both in the plant and in the home. He will also show an interesting sound film demonstrating the value of courses in first aid.

Special added attraction—through the co-operation of Lieut. E. W. Dietterle, former vice-president of the club and now serving in the armed forces of the nation, a group of army men will provide musical and comedy entertainment. Lieut. Dietterle reports that these men are specialists in this line and promises an enjoyable interlude from the more serious phases of the program.

Joseph B. Kushner in New Location

Mr. Joseph B. Kushner, well-known metal finishing consultant, has severed his connections with the Research Laboratories, Inc., and has opened a metal finishing and testing laboratory at 233 W. 26th St., from where he will continue his consulting, trouble shooting, and installation service to the metal finishing trade.

American Chemical Paint Announces Completion of Alkali Plant

According to a recent announcement, the American Chemical Paint Company has completed construction of a new, modern alkali plant at Ambler, Pa., and is transferring the activities of its Tidewater Division to this new plant. The company announces that it will continue to manufacture in this new plant all alkalis and cleaning compounds formerly manufactured at Newcastle, Del., in the Tidewater Division.

Through this change, the company will have all its activities under central control at Ambler and thus will be able to increase the effiency and promptness of its service.

101 Year Old Concern Changes Name

Lyon Iron Works of Greene, N. Y., manufacturers of Material Handling Equipment, which was established in 1840, has changed its name to Lyon-Raymond Corporation.

The change relates to name only, as the company will continue under the same management as in the past, directed by George G. Raymond, who has been president for the last 19 years.

Get Hep to This
for Polishing and Buffing!
Faster and Cheaper
ACME
SEMI-AUTOMATIC
and Lathe Combination Unit
One of the many Acme Automatics designed to speed up production and reduce production costs. Send sample for free production estimate.
ACME Manufacturing Co.
1642 HOWARD ST. • DETROIT, MICH.
Builders of AUTOMATIC POLISHING AND BUFFING MACHINES FOR OVER 25 YEARS

The business was founded in 1840 by George R. Lyon and was conducted under the management of three successive generations of the Lyon family. The executive heads, in addition to the founder, were Henry A. Lyon and Walter L. Lyon.

In 1922, Walter L. Lyon's interest was taken over by George G. Raymond. New lines of products were developed and old lines gradually discontinued, until today the company has a well rounded line of material handling equipment including hydraulic lift trucks, hydraulic elevating tables, and other hydraulic equipment. Employment is tripled over the figure of this time last year and is at the highest point in the company's history.

Lyon has pioneered in many of these items and were the first to place on the market a commercially successful hydraulic hand lift truck, also the first to develop and market a hand lift truck for handling two-faced pallets, this unit also being hydraulically operated. Among the many other handling devices credited to Lyon is a hydraulic portable elevator, recently completed and the largest unit of its kind ever built. It is used for placing and removing motors in bombing planes. A large portion of the company's products is currently being sold for defense purposes.

McNamara Sales Representative for Park Chemical Company

According to an announcement made recently by the Park Chemical Company, Mr. Ambrose McNamara, 215 Lansing Ave., Utica, N. Y., has been appointed sales representative. In this capacity, Mr. McNamara will handle Park Chemical Company grain cements and polishing compounds in New York State.

Mr. H. W. Case, 52 Willow St., Springfield, Mass., will represent this company for sales in the New England territory.

Our soldiers, sailors, and marines need planes, ships, tanks, ammunition, uniforms, and food. You can help to supply them by buying Defense Savings Bonds and Stamps.

Mention PRODUCTS FINISHING when writing to advertisers.

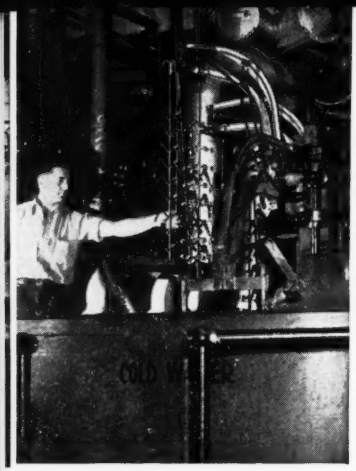
Better Buffing at Lower Cost

- Better cloth than in ordinary buffs.
- Superior construction in every detail.
- Cloth never ravels, nor wastes polishing compound.
- Easier for operators to use.
- Outlasts ordinary buffs two to one.

These are a few of many reasons why BIAS BUFFS — Genuine BIAS Buffs — made only in Jersey City will give you more buff value, lower buff costs, double the satisfaction than ordinary buffs or "types."

Try BIAS Buffs and KNOW.

The BIAS BUFF *and* WHEEL CO., Inc.
430 Communipaw Ave. Jersey City, N. J.



New PLANT EQUIPMENT AND Materials

Rusticide "50"

It is almost impossible today to handle iron or steel from mill to user in the same manner as in normal times. Long exposures, temporary storages, and duplicated handling required in proper allocation definitely leave their ill effect on the metal. In spite of all precaution, it is natural that through handling and fabrication, the metal has or accumulates rust, water stains, dirt, drawing and slushing compounds, and finger marks. The latter, a constant offender, and worse in hot weather, is caused by the salty sweat of the skin and this salt or chloride is one of the foremost rust accelerators.

Test Panel Showing Application of Rusticide "50"

These heightened conditions plus a need for more precision require that the surface be thoroughly cleaned. If even one of the above deposits is allowed to remain on the surface, the finish coats are impaired and will soon fail. It is necessary then that all accumulations be removed and the surface left chemically clean. Rusticide "50," marketed by Rusticide Products Company, 3125 Perkins Ave., Cleveland, Ohio, is compounded for this purpose.

By chemically cleaning, it is meant that all the accumulations are removed even to the point of cleaning the tiny metal pores. This truly clean surface and cleaned pores plus the mild etch imparted by Rusticide "50" are said to provide a fine tooth on which the finish coat can cling firmly.

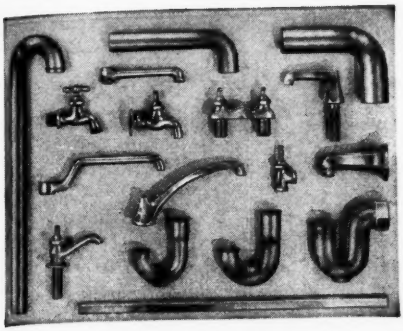
It is natural to assume that chemically cleaning would do something to the metal. It does and that something is distinctly a benefit. Not only does it work on the surface accumulations but actually unites with the metal itself to form a new surface which is passive and resistant to corrosion. Rusticide "50" is said to lay a firm foundation which will improve the life span of finish coats both as to resistance to rust and abrasion.

Benwood-Linze Metallic Rectifier Voltage Regulator

The Benwood-Linze Co., 1806 Locust St., St. Louis, Mo., has developed and is now marketing a voltage regulator for use in conjunction with its line of standard metallic rectifier electroplating units. The unit has been designated as

POLISHED & BUFFED

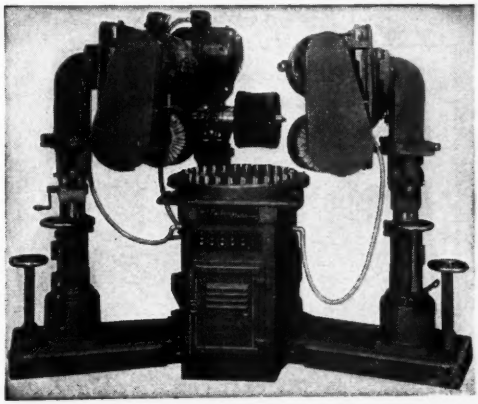
PLUMBERS BRASS GOODS



ON THE EFFICIENT

PACKER-MATIC

•AUTOMATICALLY



Increased Production and lower Finishing costs are being accomplished by manufacturers of varied types of products. Send your part with a sample finish and ask for a "Time Study" — there's no obligation.

WRITE DEPT "TS"

PACKER-MATIC No. 424 CONTINUOUS ROTARY

•AUTOMATIC POLISHING & BUFFING MACHINES

Packer-Matic

THE PACKER MACHINE CO., MERIDEN, CONN., U. S. A.

the B-L Voltage Regulator.

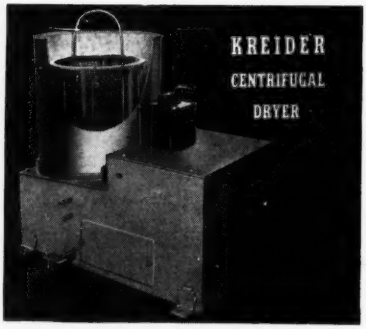
The B-L Voltage Regulator can be manually operated. It is especially designed to provide a convenient and simple means for adjusting the voltage output of each individual or bank of rectifiers.

The B-L Voltage Regulator is available in a wall mounting cabinet which may be installed adjacent to the plating tank within convenient reach of the operator and away from the rectifier units. The voltage regulator has 64 steps of adjustment, thus giving a voltage range from maximum down to one volt. A coarse control covers the full range in 8 steps, while a fine control provides 8 steps for each step of the coarse control.

The B-L Voltage Regulator provides a start-stop station permitting remote control for starting and stopping the rectifier, thereby giving the operator complete control of each tank. Incorporated in the front of the unit are two accurate, easily read meters which are sealed for protection against moisture and dust. One voltmeter and one ammeter record current and voltage of each individual rectifier. By this method of control, all the convenience of an individual tank rheostat is said to be obtained. The elimination of no-load losses is possible due to the fact that the operator can shut down the rectifier whenever a tank is not in use.

Benwood-Linze Metallic Rectifier Voltage Regulator

Boost Speed and Quality of Drying...Reduce Drying Costs



Centrifugal Drying gives your plating room fast, easily controlled drying that speeds and improves your production — reduces your costs. The new Kreider Centrifugal Dryer assures modern high-speed drying at its best. This Kreider Dryer is simple in design, easily operated by one semi-skilled worker. *Auxiliary Heating Unit—optional equipment.*

Send for Bulletin and Prices.

DELLINGER MFG. CO., 729 N. Prince, Lancaster, Pa.

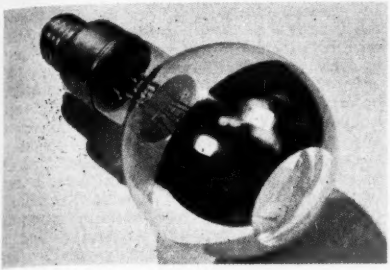
Bullseye Type Heat Lamp

A new type infra-red heat lamp to be known as the "Bullseye" type has been developed in the Birdseye Research Laboratories of the Wabash Appliance Corporation, 335 Carroll St., Brooklyn, N. Y. According to the manufacturer, this commercial type radiant heat lamp has a design and construction which make possible and practical 100 per cent control of heating efficiency.

The new bulb is designed to put to practical use for heating what Wabash engineers term as "spilled heat" usually lost. The Bullseye type of Birdseye Heat Lamp is said to control the spilled heat rays and to put them to work for heating. The new bulb is distinguished by a ring lining of pure silver sealed inside the bulb at a point just below the focal point of the filament, as shown in the accompanying illustration. This silver ring leaves a clear bullseye spot through which heat beams are projected from the filament directly to the heating area without spill or loss. All remaining heat rays, including what

were formerly spilled heat rays, are now gathered into the control area of the reflector by means of the silver ring lining, and projected down to the heating area.

By utilizing approximately 25 per cent extra heating value, the new type of bulb is said to make far greater heating efficiency possible, with great concentration of heat beams in a given area, and faster, more economical operation. A special feature is the mechanical strap-in base made heat-proof to keep the base from loosening up under the intense heat developed in infra-red tunnel installations. The new Bullseye lamp will be available in the 250 watt size, tungsten filament only. The lamps will fit the standard Edison screw socket and will have an average burning life in excess of 5,000 hours.



Bullseye Type Heat Lamp

Mixing Equipment Air Driven Mixers

The Mixing Equipment Company, 1033 Garson Ave., Rochester, N. Y., has recently announced the addition of two new models to its line of mixers. These two propeller type mixers, the AR-25 and AR-33, incorporate air driven motors and represent the first units with this type of propulsion offered by the Mixing Equipment Company.

The turbine type air motor used in these two mixers is especially designed for agitator duty with built-in muffler for quiet operation and features a low rate of air consumption. The mixers are built for operation at air pressure of from 60 to 120 lbs. with the optimum operating range between 70 and 90 pounds.

Other features of these air driven models include a quick removable shaft for ease in cleaning, adjustable shaft length for various sizes of containers, and sturdy construction with extra ball-bearing removing whip-load from the motor bearing. A universal clamp permits mixer to be used at any angle in tank. This provides complete control over the mixing action including: intentional vortexing, mild swirl, or rapid bottom-to-top turnover. A patent has been applied for on the hand tightening device, while one has been issued on the ball and socket clamp. The mixers will attach to any container or vessel. A complete line of accessories, various types of impellers, support brackets, and so on, are available for pecial applications, while a full range of metals and alloys for shafts and propellers permits use in any liquid.

The manufacturer stresses the fact that air driven mixer are not designed to supplant power driven models. In certain applications, though, they do possess definite advantage. An air motor is totally enclosed and non-sparking, thus eliminating hazards from this source. Neither can it be burned out by overloading.

The initial cost of an air-driven mixer is about the same or slightly less than an electrically driven mixer with a semi-enclosed motor. If the comparison is made between an air mixer and an

HECCO BRAND
EMERY
Made from the highest quality selected ores obtainable in this country and in the same careful and thorough manner as imported emeries.
These rough-surfaced solid-shaped grains hold unusually well in the glue.
Write for full details.
HAMILTON
Emery & Corundum Co.
CHESTER MASS.

Mixing Equipment
Air Driven Mivers

electric mixer with explosion - proof motor, the first cost of the air driven model is much less. Operating cost of the electric mixer is, however, lower due to the cost of producing an adequate supply of compressed air.

In an air driven mixer a throttle permits varying speeds to match each mixing operation. In actual use the speed of the air driven motor will also vary with the load and with variations in air pressure, a definite advantage in some cases.

The "Lightnin" AR-25 operates at 1,750 r.p.m. A 36-in. shaft with three inch propeller is standard. Weight is 25 lbs. The AR-33 has the lower operating speed of 400 r.p.m. and comes equipped with a standard 36-in. shaft. Propeller size is 7 in. Weight of the complete mixer is 29 pounds.

RUST-I-CIDE "50"

CLEANS METAL
Easily and Quickly

REMOVES RUST

. . . and provides a foundation for good, lasting finishes.

RUST-I-CIDE "50"

★ Imparts better adhesion by mildly etching.

★ Gives longer life by preventing rusting from within.

★ Chemically cleans—dissolves and *removes* common shop accumulations.

★ Instantaneous action and low cost.

That's why so many companies working on defense orders are using RUST-I-CIDE

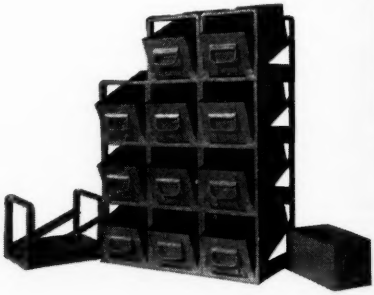
RUSTICIDE PRODUCTS COMPANY
Cleveland, Ohio

Stackbin Slant-Box Rack

A new type of rack has recently been announced by the Stackbin Corp., 92 Troy St., Providence, R. I., which is designed to store ordinary shop boxes at an angle which effectively converts them into hopper-fronted storage bins and automatically feeds contents toward the front. Slant-Box Racks are individual racks of welded steel construction which interlock to form storage units of any desired shape or capacity.

In the new Slant-Box Racks, contents of boxes are always visible and instantly accessible. Tilted runners hold boxes at the proper angle and a wide lip keeps them held securely in position. The use of standard Stackrack construction permits high stacking in interlocking units which form a storage rack of any desired height, shape, or capacity.

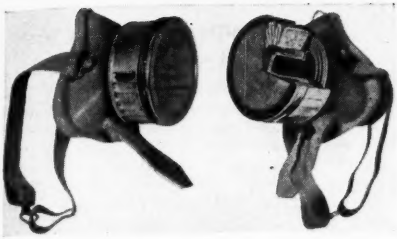
Made entirely of heavy angle and channel steel, with all joints welded, Stackbin Slant-Box Racks make rigid, permanent storage facilities, which can be changed or added to as conditions demand. Made in sizes to fit boxes now in use, Slant-Box Racks save space, time, and labor by converting present boxes into efficient hopper-fronted bins.



Stackbin Slant-Box Rack

DeVilbiss "MSD" Respirator

A respirtator designated as the "MSD" which is said to afford maximum protection against the inhalation of pneumoconiosis-producing and nuisance dusts has been placed on the market by The DeVilbiss Company, 300 Phillips Ave., Toledo, Ohio. Approved by the United States Bureau of Mines, the new DeVilbiss "MSD" Respirator is said to embody nine unique features. These combined make it more compact, lighter,



DeVilbiss "MSD" Respirator

easier to breathe through, and more comfortable to wear, and easier to clean and maintain than previous models.

In the new respirator, a scientifically and compactly designed cartridge, measuring only 2⅞ by 1½ in. and weighing but one ounce, actually provides more than 41 sq. in. of breathing and filtering area. Ingenious multi-vane construction allows every inch of this filter to be used efficiently. According to the manufacturer, this means no air restriction to cause difficulty in breathing, plus greatly increased filtering efficiency.

The filter can be easily cleaned by blowing accumulated dust from vanes with an air dusting gun or nozzle, thus maintaining peak performance and requiring less frequent replacement. The new DeVilbiss "MSD" Respirator is designed to fit, closely and without leakage, the contour of practically any face. This is an important feature, for full protection depends upon a good fit.

Bergonize

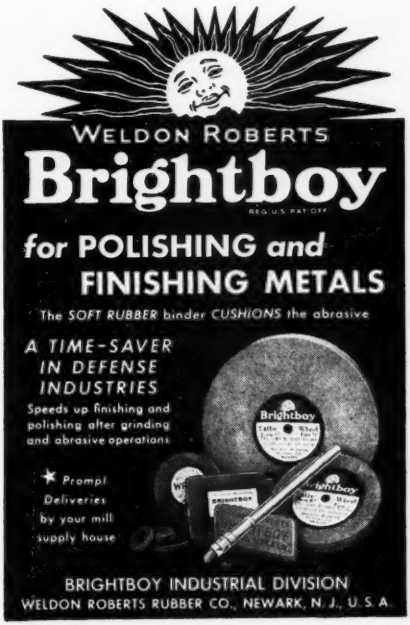
A washable protective covering for flat wall paint, compounded especially for use in plants where it is desirable to provide for easy cleaning of painted walls has been announced by The Bergonize Company, Merchandise Mart, Chicago, Ill. The material is to be known as Bergonize.

Bergonize may be applied over a newly painted or a cleaned wall and provides a clear, transparent, flat protective film that prevents dust, dirt, and grime from penerating the pores of the paint. The material is odorless and dries flat within 20 minutes at 70 deg. F. and possesses high abilit·· to reflect and diffuse light. Bergonize may be removed from a protected surface merely by application of water with a sponge or rag. The removal of the Bergonize coating takes with it all dirt and leaves the surface in its original paint clean condition. Bergonize is not recommended for use in departments where an extensive amount of steam escapes into the air and where condensation takes place on the walls or ceiling.

Gast V-Belt Driven Rotary Air Pump

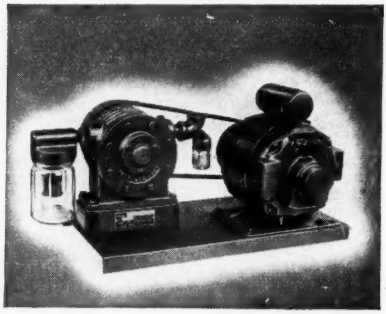
The newest addition to the Gast line of vacuum pumps and compressors is a V-Belt Driven Rotary Air Pump especially suited for a variety of slow-speed applications. This pump is now being marketed by Gast Manufacturing Corporation, Hinkley St., Benton Harbor, Mich. The new Gast model 15F50 is specifically designed to meet the demand for a V-Belt driven pump of good capacity in cubic feet per minute that will provide medium vacuum service.

Important features of the Gast Pump are said to include slow, quiet operation, long life, ease of installation, regardless of shaft height or diameter, and low power required in proportion to the large air volume delivered. Simply by changing the size of the motor pully, this pump is readily adapted for operation with ¼, ⅓, ½,


WELDON ROBERTS
Brightboy
REG. U.S. PAT. OFF.
for POLISHING and FINISHING METALS
The SOFT RUBBER binder CUSHIONS the abrasive
A TIME-SAVER IN DEFENSE INDUSTRIES
Speeds up finishing and polishing after grinding and abrasive operations
★ Prompt Deliveries by your mill supply house
BRIGHTBOY INDUSTRIAL DIVISION
WELDON ROBERTS RUBBER CO., NEWARK, N. J., U. S. A.

and ¾ h. p motors. A heavy duty shaft and large ball bearings amply take care of belt side-thrust. The pump sheave incorporates a cooling fan.

The rotary design of this new model,



Gast V-Belt Driven Rotary Air Pump

as in all Gast Air Pumps, provides operation without gears, springs or valves, which is said to result in usually economical and trouble free performance.

THE ADIRONDACKS GORE MOUNTAIN CRYSTAL GARNET ORE

ABRASIVE GARNET

For

Abrasive Paper and Cloth
Grinding Wheels
Sand Blast
Minus 300 Mesh for
Polishing and Lapping
Grades for Barrel Finishing

Ample Stocks Insure Prompt Shipment

BARTON MINES CORPORATION

NORTH CREEK, WARREN COUNTY, N. Y.

Tulca Supervisor Safety Spectacles

The Tulca Division of the Univis Lens Company, Dayton, Ohio, has added a new, rimless-type, safety spectacle to its eye protection line. The "Supervisor" Spectacle is fitted with the company's special material (not glass) Tulca Safety Lenses. They are available with or without side shields.

According to the manufacturer, these safety spectacles are as comfortable and as pleasing in appearance as regular eyeglasses because of the extremely light weight of the Tulca Lenses. They are designed specifically for use by supervisors, checkers, inspectors, maintenance men, and by visitors who are exposed to eye hazards in plants, even though they are not actively engaged in operations where the wearing of goggles is mandatory.

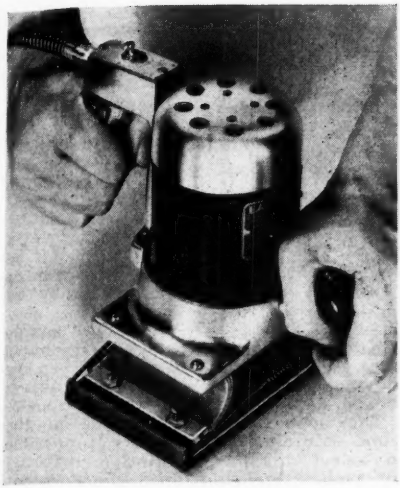
Supervisor Safety Spectacles

One of the most important safety features of these Tulca Lenses is the fact that they do not pit.

Easy Model XL Reciprocating Electric Sander

To meet the grueling service of two and three shift duty demanded today by the defense industries, the Detroit Surfacing Machine Co., 7433 W. Davison, Detroit, Mich., has placed on the market a new model Easy Reciprocating Electric Sander to be known as the "XL."

The new model Easy XL embodies numerous improvements. Vibration has been reduced to a minimum through precision balancing and redesign of handle mountings. An interchangeable front handle which can be shifted from front



Easy Model XL Reciprocating Electric Sander

to side position enables the operator to work into close corners, at right angles, and directly against vertical surfaces.

An improved type fan and baffle plate increase the flow of air through the motor, insuring adequate cooling. Motor, filter, and switch are now readily accessible through use of a new type motor filter cap. These machines are available with 110 or 220 volt motors.

The Model XL is designed and built to deliver maximum efficiency and performance on every finishing application — sanding, rubbing, and polishing — on metal, plastics, leather, or composition materials.

Udylite Automatic Parkerizing Machine for Small Parts

The Udylite Corporation, 1651 E. Grand Blvd., Detroit, Mich., manufacturer of plating and polishing equipment and supplies, announces the development of a new automatic Parkerizing machine capable of processing large quantities of small parts. It is said that this machine is ideal for those manufacturers who have large national defense contracts involving the production of .30 and .50 calibre steel machine gun links, Garand rifle clips, miscellaneous machine gun parts and other small parts which require the Parker finish.

The machine is a hopper type unit, air or hydraulically driven according to the desires of the customer. The parts are loaded in batches at one end and progressively transferred through the various dipping tanks required for the Parker process. The machine is fully automatic. No manual handling whatever is required for the complete Parkerizing cycle including cleaning, rinsing, Parkerizing, rinsing, baking and oiling. Each batch remains a separate unit throughout the entire cycle and one load cannot be mixed with another. The machine is completely hooded to conserve heat.

All parts of the machine are easily accessible for replacement, as the construction is exceedingly simple. There are few moving parts.

An automatic feature of the machine eliminates the necessity of wide aisles near the individual units and effects a great saving in floor space. This feature also eliminates a large portion of the floor grills or duct boards needed around individual tanks.

An automatic transfer greatly reduces the man hours necessary to process small batches of work through the various solutions. The only manual

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RUST INHIBITIVE

Formulated specifically for the following properties:

1. **Very fast air-drying**
2. **Water-whiteness**
3. **Tenacious adhesion**
4. **Hardness combined with flexibility**

and

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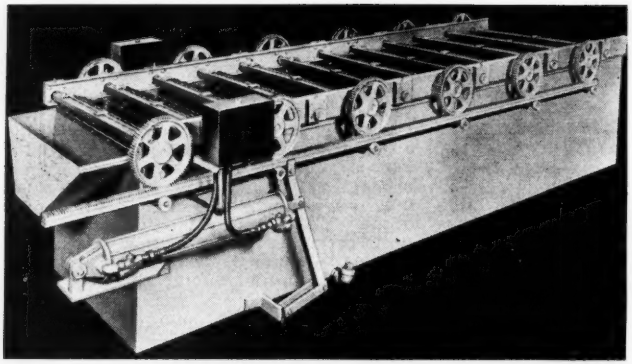
is used and recommended as a clear coating for hand tools, machine tools, hardware and wherever a clear protective coat for bright metal is required.

The Varnish Products Co.
5208 Harvard Ave. Cleveland, Ohio



Udylite Automatic Parkerizing Machine for Small Parts

labor required is at either end of the machine.

Operators using this machine do not need rubber gloves, boots, or aprons and do not come in contact with the material after it is loaded until it is discharged clean and dry. No baskets are needed to transfer the work from one solution to another.

The entire machine is driven by one motor. This eliminates the need for individual motor drives and the accessories such as starters, conduit, and so on. The machine is shipped complete, ready to connect to the water, air and electric supply and will greatly reduce the amount of labor and material needed in a manually operated layout.

The removal of the operator from over the tanks will increase his productive capacity as he is not endangered by fumes. The operator will be more efficient during the summer months when he can work in comfortable clothing unhampered by boots, aprons, or gloves.

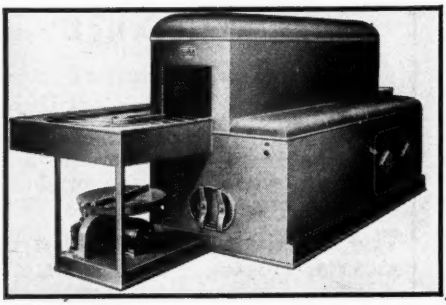
The amount of work processed in a day is not governed by the operator and each batch of parts is given the exact treatment designated by the time clock on the machine. The machine is timed by an electric clock and cannot be slowed down or speeded up by an unauthorized person. The simple design eliminates many expensive moving parts and permits easy access to the hoppers for removal or repair.

The hoppers always operate in the same solution. This makes it possible to select the most suitable material for each hopper and obviously increases the life of the rubber covering in the hoppers, as they do not have to operate in the hot cleaning and drying stations which are destructive to all rubber coatings.

The Udylite Automatic Parkerizing Machine is designed to process bulk parts in large or small quantities and give the finishing room a machine comparable to the automatic screw machines, punch presses, and so on, long accepted as commonplace in other production departments.

Alsop Propeller Type Portable Electric Mixers

Portable type electric mixers designated as "Hy-Speed" are being marketed by the Alsop Engineering Corporation, 8 Bright St., Milldale, Conn. These mixers are said to be highly effi-



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Industrial Washing Machines

Streamlined design. Hidden motors, pumps and pipes are easily assembled. Piping and nozzles located to insure thorough cleansing of all surfaces. Rugged and efficient pressure pump. Corrosion resistant spray nozzles—from mist to open stream. Monorail, Belt or Gravity type conveyors designed to carry any shape or size material. Variable speeds on conveyor drive synchronize production.

International Conveyor & Washer Corp.
Write for circular.
640 E. FORT ST. DETROIT, MICH.

cient wherever liquids, liquid and solids, or liquid and gases are processed. The portable mixers are available for rim mounting on open vessels. The

Alsop Propeller Type Portable Electric Mixer

ease with which they can be attached to any open tank makes it practical in many cases to use one mixer on a number of different tanks.

A new and improved swivel clamp is used on all portable models which is said to make it possible to position the shaft at any angle with the vertical and any arc of the circle right or left of the tank center. This is said to give a variety of mixing action.

Many types and combinations of propellers are available such as push, push-pull, studded, cutout, perforated, saw tooth, folding, and so on.

RECOVERED TALLOW

An excellent Tallow reclaimed from Harness Leather. This product is unusually high in heat resistance, due to the absorption of the natural chemical properties contained in harness leather.

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Dept. P.F.
2160 Montcalm St., Indianapolis, Ind.

M.S.A. Single Filter Dustfoe Respirator

A new and improved M.S.A. Single Filter Dustfoe Respirator has been placed on the market by Mine Safety Appliances Company, Braddock, Thomas and Meade Sts., Pittsburgh, Pa. A featured improvement of the Dustfoe is a new single filter which is said to replace the two-part—felt screen and cellulose—fiterls used previously. This new filter is all in one piece, thus providing protection against a broad range of dusts and mists, according to the manufacturer. The filter is more porous on the outer side so that large particles are filtered out first, thus preventing rapid build up of breathing resistance through clogging the filter.

Other well-known features of the M. S.A. Dustfoe Respirator are retained. The compact, lightweight unit offers low breathing resistance and full vision in every direction. A protective filter cover prevents contamination of filter by grease and dirt from hands and equipment. A foolproof exhalation valve provides drainage. The formable facepiece of the Dustfoe may be shaped to fit individual face contours.

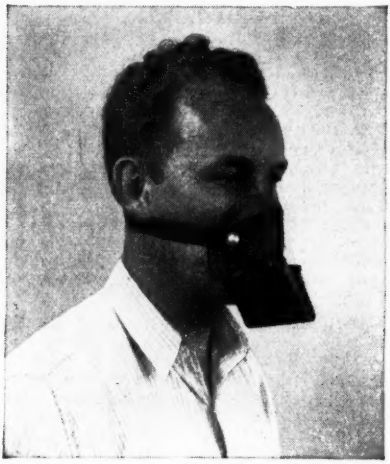
Interesting Finishing Facts

Navy specifications on the painting of Class Y N Net Tenders, the ships that lay meshes of cables to trap submarines, cover 32 typewritten pages.

To qualify for jobs as inspectors responsible for matching exact shades of white on the enameled surfaces of electric refrigerators and ranges, employees at the Mansfield, Ohio, plant of the Westinghouse Electric and Manufacturing Company must pass tests to determine whether they are deficient in Vitamin A. The use of Vitamin A is said to result in a reduction of rejections of material and saving in production time due to the comfort it is said to provide in preventing strain and fatigue of the workers' eyes.

Mention PRODUCTS FINISHING when writing to advertisers. Your cooperation will be appreciated both by the advertiser and this magazine.

The M.S.A. Single Filter Dustfoe Respirator is particularly suited for manufacturers who have programs of regular cleaning and maintenance of respirators. The unit can be completely disassembled without tools in a few seconds. Every part is interchangeable and, except for the filters, can be washed and sterilized. Inexpensive single throw-away filters permit a fresh, new filter with each cleaning.



M.S.A. Single Filter Dustfoe Respirator

Best Offense

against

Rust and Grease

SOL-KLEAN

INDUSTRIAL CHEMICAL PRODUCTS CO.

DETROIT

Ft. Wayne **Milwaukee**

Thur-Ma-Lox High Heat Resisting Coatings

High heat resisting coatings which resist temperatures up to 1,600 deg. F have been placed on the market by Thurmalox Co., 3109 N. Broad St., Philadelphia, Pennsylvania.

Thur-Ma-Lox No. 7 Black will withstand temperatures up to 1,600 deg. F and No. 10 Aluminum will withstand up to 1,200 deg. F.

Hardcote Finishes

The McDougall-Butler Co., Inc., 2 Evans St., Buffalo, N. Y., is now marketing a high-grade line of rapid-drying finishes made from synthetic resins and tough, durable oils for application on inside and outside surfaces. These finishes are said to be unusually durable, tough, and weather resistant.

One of the outstanding features of Hardcote Finishes is said to be a one hour drying time. The finishes may be applied by either brush or spray methods and will set out of dust in about 15 minutes. On properly prepared surfaces, Hardcote Finishes will cover in one coat without showing brush marks and will produce a rich, full gloss finish which is said to be resistant to alcohol, acids, alkalis, and so.

Hardcote Finishes are particularly suited for use on automobiles and auto accessories, buses, trucks, metal furniture, bars, fixtures, metal stampings, castings, and miscellaneous hardware. According to the manufacturer, Hardcote Finishes may be intermixed to produce a wide variety of tints and shades because of the exceptional cleanliness and fine quality of the pigments used.

Binks Automatic Shell Coating Spray Equipment

Automatic spray painting equipment manufactured by Binks Manufacturing Co., 3112 Carroll Ave., Chicago, Ill., is now being used to coat the outside of shells, in sizes ranging from 20 mm

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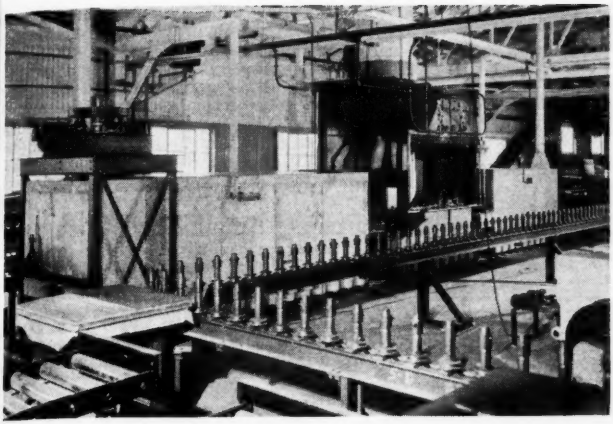
THE ROBERTS ROUGE CO., Specialists in manufacturing thoroughly dependable Gold, Sterling and Silver Plate Rouges; Stainless Steel, Chrome and Crocus Compounds. STRATFORD, CONN



Binks Automatic Shell Coating Spray Equipment

to 105 mm. at the rate of 1,000 an hour in several large shell loading plants of the United States Government Ordnance Department.

The finishing is entirely automatic with the exception of loading and unloading the spindles. The shell parts to be finished are placed manually on spindles which are mounted on a long conveyor chain. Simple masking rings and plugs are used to protect threads from becoming coated in the finishing process. The spindles with their loads first pass through a Binks preheating oven which conditions the shells for finishing by removing all traces of moisture. From this oven the spindles carry the shells directly into a Binks Dynaprecipitor Water Wash Spray Booth.

Here the spindles begin to revolve rapidly and as each one comes in front of the Binks automatic spray guns, the shell on it receives a fine, even coating. To avoid waste, the guns operate only when a loaded spindle is in front of them. The freshly coated shell is next carried into a Binks drying oven, from which it emerges four minutes later completely dried and ready for immediate handling. In this way a shell is completely coated and dried every 3.6 seconds.

The coating material is supplied to the two or more Binks automatic spray guns through a Binks paint circulating system. Paint regulators, oil and water extractors, and hose cleaner are conveniently mounted on the booth.

In addition to the above equipment Binks has also developed automatic and semi-automatic machines for spraying the inside and outside of shells ranging from the small 20 mm. size up to 2,000 lb. bombs. These machines vary greatly in the required production rate according to the needs of each manufacturer.

International Pallet Type Washing Machine

A pallet type washing machine in which the conveyor returns work along one side of the machine instead of underneath has been placed on the market

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Any quantity.
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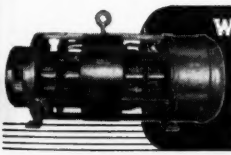

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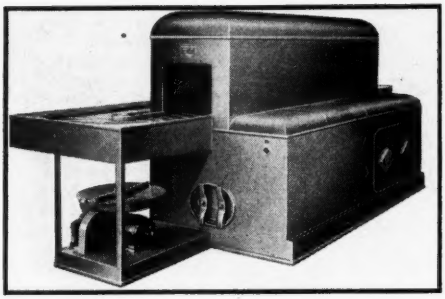


International Pallet Type Washing Machine

by International Conveyor & Washer Corporation, 640 E. Fort St., Detroit, Mich. Parts to be washed can be loaded in tote pans and passed through the unit and returned to the same operator for unloading. These units are available built with wash, rinse, hot air blow-off, and some with final oil spray.

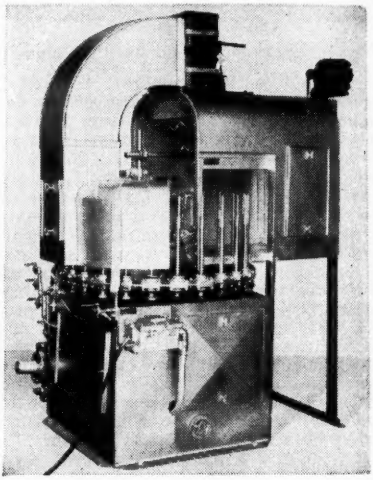
The unit shown in the illustration is furnished with steam coil and injectors or with the push through gas fired burners and automatic controls. A hot air blow-off unit may be furnished either with steam heater coils or with a gas air heater. The solution tanks of this unit are fitted completed with removable screens, drains, overflows, skimmers, sludge baffles, cleanouts, water inlets, and dial thermometer. Steam regulators for control of steam coils are also available.

A drain pan is placed underneath the conveyor over the solution tank which delivers the solution that is sprayed on the work to one end of the solution tank and then flows back in a circuitous path over the sludge baffles, through a removable screen and into the pumps. This is said to permit the flow of liquid to be at a minimum speed and allow particles to settle out of the solution.

The lower spray pipes under the conveyor are placed crosswise to the machine which extends into a suction chamber at the side. Inspection doors on the side of the housing are said to give quick access to the upper spray headers.

Eclipse Small Shell Sprayer

An automatic spray machine for coating and drying the outside of small shells (20 to 40 mm.), grenades, shot, or boosters has been built by the Eclipse Air Brush Co., 400 Park Ave., Newark, N. J. The machine consists of an automatic turntable on which the



Eclipse Small Shell Sprayer

NALCO DRITHERM
CARBON FILAMENT LAMPS
Best For Infra-Red Ray Drying
Nalco Dritherm Lamps are the carbon filament type...proved for years in therapeutic and industrial practice as providing maximum emanation of infra-red ray within the desirable penetrating band. Made only by—
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pieces are carried on indexed spindles to a position in front of automatic spray guns in a booth equipped with an exhaust fan.

After being coated, the pieces pass through a small oven opposite the spray booth. A unit heater with blower fan ensures rapid drying so that the pieces can be removed manually as they emerge from the oven.

The entire unit is unusually compact, occupying a floor space of only 4 x 4 ft., and all working parts are enclosed wherever possible to reduce maintenance to a minimum.

Goodrich Lacquer Spraying Equipment Hose

A new type hose for all standard paint and lacquer spraying equipment, with the tube built of Ameripol, its own type of synthetic rubber developed in its laboratories, has been announced by The B. F. Goodrich Company, Akron, Ohio. The new line replaces the company's lacquer hose and its Mainstay line of paint spray hose.

The new hose is made in inside diamters of ¼, 5/16, ⅜ and ½ inch and outside diameters of ½, 33/64, 11/16 and ⅞ inch, all standard dimensions for standard paint and lacquer spraying equipment.

In the ½ inch inside diameter size, construction will be two-braid while in the other sizes it will be one-braid, made of heavy high tensile cords. It is capable of being used as air hose with ample margin of safety.

The tube is a black, oil resistant compound, while the working pressure for all sizes is 150 lbs. maximum. With the addition of the new hose to its line, the company now has a full range of synthetic rubber lined hose from ¼ inch inside diameter to the 10 inch inside diameter Type 400 oil hose.

Birdseye Floodlighting Concentrator

A new-type concentrating floodlight bulb designed for high bay lighting in industrial plants has been developed by

Birdseye Floodlighting Concentrator

the Birdseye Division of Wabash Appliance Corporation, 335 Carroll St., Brooklyn, N. Y. The Birdseye bulb is said to deliver a concentrated flood of light that cuts through distance, haze, and smoke to provide brilliant illumination even in factories where high ceilings and traveling cranes or other obstructions make it impractical to install lights closer to the work plane.

The Birdseye Floodlight bulb is designed especially to force down to the

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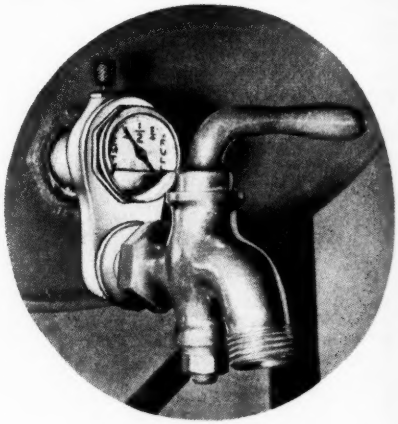
work plane level the full light that the filament develops. The filament is mounted at the exact focal point of the hump-shaped parabola of the bulb so that the light rays are forced straight out of the bulb without waste. The inside of the bulb is lined with pure polished silver to form a permanently brilliant reflector that cannot be dimmed by dirt, fumes, or smoke. A 1,500 watt industrial size bulb is shown in the illustration. Twelve smaller sizes are available.

U-C Level Indicator for 55-Gallon Drum

An indicator to be known as the "U-C Indicator" for particular use on 55-gallon drums is now being marketed by U-C Level Indicator Sales, 828 N. Broadway, Milwaukee, Wisc. The U-C Indicator consists of a cork float mounted on wire rods, the level of which is indicated on a gauge on an external fitting. The fitting is constructed to receive a standard faucet or spigot.

The U-C Level Indicator provides the means for checking at a glance the contents of various drums of oil, solvents, or other liquids. The U-C Indicator fits all standard 55-gallon steel drums. According to the manufacturer, it can be as easily attached as a faucet. When the drum is empty, the entire assembly is removed and attached to a full drum.



U-C Level Indicator for 55-Gallon Drum

Protective Finishing of Engineering Products

One of the engineering defense training courses in the College of Engineering, New York University, is being offered under the heading "Protective Finishing of Engineering Products." The classes in this course meet twice a week for 7½ weeks. The entire course will cover a total of 45 hours.

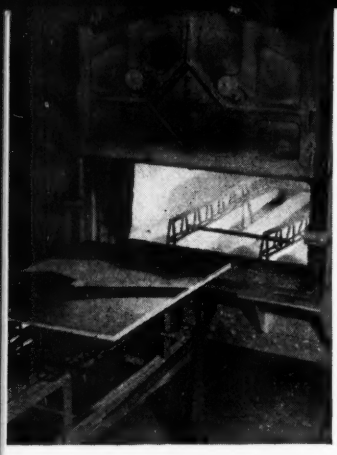
The course covers types of finishing of engineering products for protection and decoration. This includes organic, metallic, and miscellaneous coatings. Aircraft and structural finishing problems will be included, in addition to general engineering applications.

The prerequisites for the course are as follows: Three years of accredited engineering college education in chemical or mechanical engineering. Majors in chemistry or metallurgy will also be considered, as well as applicants with an acceptable amount of industrial experience in this field.

Mention PRODUCTS FINISHING when writing to advertisers.

The Finishing Touch *By J. A. Patterson*

"I don't know what you birds see in that girl from the office—she gets our instructions wrong—she can't spell—she can't type—she can't do a thing."



FOR YOUR Catalog LIBRARY

To obtain copies of the catalogs listed here, indicate on the coupon the number of the item in which you are interested and mail as directed.

1. Automatic Temperature Control in Electroplating Processes

A six-page folder illustrating and describing installations of automatic temperature control in plating operations is now being issued by The Foxboro Company, Foxboro, Massachusetts.

2. Industrial Styling with Color

A beautifully illustrated catalog depicting advertisements which have appeared in various magazines on Pittsburgh Industrial Finishes is now being issued by Pittsburgh Plate Glass Co., 2121 Grant Bldg., Pittsburgh, Pennsylvania.

3. Easy Electric Sander

An improved model Easy Electric Sander for sanding, rubbing, polishing, and so on, is described in a 4-page catalog now being issued by Detroit Surfacing Machine Co., 7433 W. Davison, Detroit, Michigan.

4. Milton Roy Chemical Pumps

A complete, informative catalog and a real aid in the selection and purchase of chemical and proportioning pumps is now being issued by Milton Roy Pumps, 1300 E. Mermaid Ave., Chestnut Hill, Philadelphia, Pennsylvania.

5. Finishing Suggestions

"Finishing Suggestions on Metal That Will Reduce Costs" is the title of a 6-page folder which is now being issued by Sundstrand Machine Tool Co., 11th St. and Harrison Ave., Rockford, Ill.

6. Chromium Chemicals

The uses and technical properties of chromium chemicals are described in a booklet which is now being issued by Mutual Chemical Co. of America, 270 Madison Ave., New York City.

7. Dust Respirator

A lightweight, compact, and efficient dust respirator designated as the "MSD" is described in a 4-page folder which is now being issued by The DeVilbiss Company, 300 Phillips Ave., Toledo, Ohio.

8. Balanced Lighting

A profusely illustrated 12-page catalog describing balanced lighting as a "must" in modern industry is now being issued by The Fostoria Pressed Steel Corporation, Fostoria, Ohio.

9. Park Finishing Bulletin

A 4-page bulletin describing polishing, rubbing, and buffing compositions, and Kold Grip Grain Cement is now being issued by Park Chemical Company, 8074 Military Ave., Detroit, Michigan.

10. The Airless Wheelabrator

The question "What Is the Airless Wheelabrator and What Will It Do?" is the title of a 16-page booklet now being published by the American Foundry Equipment Co., 621 S. Byrkit St., Mishawaka, Indiana.

11. Polishing and Buffing Wheels

The Advance line of polishing and buffing wheels for the metal-finishing industry is described in a 28-page illustrated catalog now being issued by Advance Polishing Wheels, Inc., 844 W. 49th Pl., Chicago, Illinois.

12. New Wrinkles in Finishing

Vol. 3, No. 3 of this publication contains 12 pages of pertinent information on the application of Wrinkle Finishes marketed by New Wrinkle, Inc., Mutual Home Bldg., Dayton, Ohio.

13. Hammond Variable Speed Lathe

A four-page folder illustrating and describing a method by which speed changes of 1,500 to 3,000 r.p.m. can be obtained instantly on the Hammond VRO Polishing and Buffing Lathe is now being issued by Hammond Machinery Builders, Inc., 1622 Douglas Ave., Kalamazoo, Michigan.

14. Metal Conditioner and Cleaner

A corrosion solvent process designated as Corrosol No. 6 for use in protecting metal and prolonging life of paints is described in a folder now being issued by International Rustproof Corporation, 12507 Plover Ave., Cleveland, Ohio.

15. Textured Enamel Finish

An improved textured enamel finish known as Rincontrol is fully illustrated and described in a folder now being issued by Roxalin Flexible Lacquer Co., Inc., Box 713, Elizabeth, New Jersey.

16. Heavy Duty Grinders and Buffers

The complete line of Marschke Heavy Duty Grinders and Buffers manufactured by Vonnegut Moulder Corporation, 1845 Madison Ave., Indianapolis, Ind., is illustrated and described in a 22-page catalog now being issued by the company.

17. Du Pont High Speed Brass

The Electroplating Division of E. I. du Pont de Nemours & Company, Wilmington, Del., is now issuing a catalog for the rapid production of smooth, bright brass deposits.

18. Industrial Washing Machines and Conveyors

A folder telling how seven famous companies solved their product washing problems is now being issued by The Alvey - Ferguson Company, 75 Disney St., Cincinnati, Ohio.

19. Profits in Air

The manner in which electrostatic air filters help industrial plants eliminate losses resulting from contamination of products by dust, smoke, and fumes is described in a four-page folder which is now being issued by American Air Filter Co., Inc., 242 Central Ave., Louisville, Kentucky.

20. Airway Ventilated Buffs

Cool cutting buffs for high speed buffing operations are illustrated and described in a 4-page folder now being distributed by Jackson Buff Corporation, 20-03 41st Ave., Long Island City, New York.

21. Metal Cleaning Tips

The chemical classification and selection of alkaline metal cleaners is contained in a bulletin which has been prepared and is now being distributed by the Cowles Detergent Company, 7016 Euclid Ave., Cleveland, Ohio.

22. General Electric Immersion Heaters

Bulletin GEA-3195 now being issued by General Electric Company, Schenectady, N. Y., tells how to heat electroplating baths with General Electric Immersion Heaters.

Print plainly in filling out coupon for literature.

PRODUCTS FINISHING
431 Main St., Cincinnati, Ohio

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